

COASTAL OBSERVATION PROGRAMME - ENGINEERING (COPE)
MAROOCHYDORE - MAROOCHY SHIRE
FOR THE YEARS 1976 TO 1981
REPORT NO. C20.1

Beach Protection Authority

March 1986

All reasonable care and attention has been exercised in the collection, processing and compilation of the COPE data included in this report. However, the accuracy and reliability of this information is not guaranteed in any way by the Beach Protection Authority and the Authority accepts no responsibility for the use of this information in any way whatsoever.

DOCUMENTATION PAGE

REPORT NO.:- C20.1

TITLE:- Report - Coastal Observation Programme - Engineering (COPE),
Maroochydore - Maroochy Shire

DATE:- March 1986

TYPE OF REPORT:- Technical Memorandum

ISSUING ORGANISATION:- Beach Protection Authority
G.P.O. BOX 2195
BRISBANE QLD 4001
AUSTRALIA

DISTRIBUTION:- Public Distribution

ABSTRACT:-

This report provides a summary of primary analyses of COPE data on wind, wave and beach processes observed at Maroochydore, within Maroochy Shire in south east Queensland. The data were recorded by volunteer observers Mr J. Leadbetter, Mr J. Smith and Mr W. Bennett during the period July 1976 to August 1981. The recordings were made daily during the five year period and the information published is considered representative of the long term conditions.

OTHERS AVAILABLE IN THIS SERIES:-

Coastal Observation Program - Engineering (COPE), Machans Beach -
Mulgrave Shire, (Report C01.1).

Coastal Observation Program - Engineering (COPE), Baffle Creek -
Miriam Vale Shire, (Report C02.1).

Coastal Observation Program - Engineering (COPE), Flying Fish Point -
Johnstone Shire, (Report C03.1).

Coastal Observation Program - Engineering (COPE), Woodgate - Isis Shire,
(Report C04.1).

Coastal Observation Programme - Engineering (COPE), Shelly Beach -
Landsborough Shire, (Report C05.1).

Coastal Observation Programme - Engineering (COPE), Eurong -
Maryborough City, (Report C06.1).

Coastal Observation Programme - Engineering (COPE), Lammermoor
Beach - Livingstone Shire, (Report C07.1).

Coastal Observation Programme - Engineering (COPE), Noah Creek -
Douglas Shire, (Report C08.1).

Coastal Observation Programme - Engineering (COPE), Cardwell -
Cardwell Shire, (Report C09.1).

- Coastal Observation Programme - Engineering (COPE), Surfers Paradise - City of Gold Coast, (Report C10.1).
- Coastal Observation Programme - Engineering (COPE), Mission Beach - Johnstone Shire (Report C11.1).
- Coastal Observation Programme - Engineering (COPE), Urangan - Town of Hervey Bay, (Report C12.1).
- Coastal Observation Programme - Engineering (COPE), Noosa Beach - Noosa Shire, (Report C13.1).
- Coastal Observation Programme - Engineering (COPE), Shingly Beach - Proserpine Shire, (Report C14.1).
- Coastal Observation Programme - Engineering (COPE), Yeppoon - Livingstone Shire, (Report C15.1).
- Coastal Observation Programme - Engineering (COPE), Bargara - Woongarra Shire, (Report C16.1).
- Coastal Observation Programme - Engineering (COPE), Barwell Creek - Livingstone Shire, (Report C17.1).
- Coastal Observation Programme - Engineering (COPE), Currigee - City of Gold Coast, (Report C18.1).
- Coastal Observation Programme - Engineering (COPE), Newell Beach - Douglas Shire, (Report C19.1)

REFERENCES:

1. ROBINSON, D.A. AND JONES, C.M.
 Queensland Volunteer Coastal Observation Programme - Engineering (COPE). 3rd Australian Conference on Coastal and Ocean Engineering, Melbourne, April 1977.
2. PATTERSON, D.C. AND BLAIR, R.J.
 Visually Determined Wave Parameters. 6th Australian Conference on Coastal and Ocean Engineering, Gold Coast, July 1983.

CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 The Programme	1
1.2 Site Selection	1
1.3 Instrumentation	1
1.4 Observers	1
1.5 Accuracy	1
1.6 Presentation of Data	2
2.0 STATION PARTICULARS	2
2.1 Location	2
2.2 Observers	2
2.3 Observed Parameters	2
2.4 Tidal Information	3
2.5 Description of Beach	3
2.6 Supervision of Station	4
3.0 DATA	4
3.1 General	4
3.2 Wind	4
3.3 Waves	4
3.4 Longshore Current	5
3.5 Beach Profile Parameters	5
3.6 Monthly Beach Profiles	5
4.0 ATTACHMENTS	
Tables (see over for List of Tables)	
Figures (see over for List of Figures)	

LIST OF TABLES

Table No.	Title	
1	Monthly and Annual Wave Parameters Summary	1976
2	Monthly and Annual Wave Parameters Summary	1977
3	Monthly and Annual Wave Parameters Summary	1978
4	Monthly and Annual Wave Parameters Summary	1979
5	Monthly and Annual Wave Parameters Summary	1980
6	Monthly and Annual Wave Parameters Summary	1981

LIST OF FIGURES

Figure No.	Title	
1	Locality Plan	
2	Wind Data	
3	Wave Height % Exceedance	
4	Percentage Occurrence of Wave Height and Wave Period All Data	
5	Wave Direction Analysis	
6	Surf Zone Width - Morning	1976
7	Surf Zone Width - Afternoon	1976
8	Surf Zone Width - Morning	1977
9	Surf Zone Width - Afternoon	1977
10	Surf Zone Width - Morning	1978
11	Surf Zone Width - Afternoon	1978
12	Surf Zone Width - Morning	1979
13	Surf Zone Width - Morning	1980
14	Surf Zone Width - Morning	1981
15	Littoral Currents - Morning	1976
16	Littoral Currents - Afternoon	1976
17	Littoral Currents - Morning	1977
18	Littoral Currents - Afternoon	1977
19	Littoral Currents - Morning	1978
20	Littoral Currents - Afternoon	1978
21	Littoral Currents - Morning	1979
22	Littoral Currents - Morning	1980
23	Littoral Currents - Morning	1981
24	Beach Profile Parameters	1976
25	Beach Profile Parameters	1977
26	Beach Profile Parameters	1978
27	Beach Profile Parameters	1979
28	Beach Profile Parameters	1980
29	Monthly Beach Profiles	1977-1978
30	Monthly Beach Profiles	1979-1980

1.0 INTRODUCTION

1.1 The Programme

The Beach Protection Authority requires basic data on the behaviour of Queensland's beaches in order to provide well founded advice on coastal management to Local Authorities. The COPE project aims to collect information on wind, waves and beach behaviour in areas where extensive investigations are not practical and where otherwise little or no data exist.

The project is based on the recruitment of volunteer observers who are prepared to record a series of basic parameters once or twice daily for at least a three year period.

1.2 Site Selection

In selecting a site for a COPE station, consideration is given to:-

- (a) the general shoreline configuration and the possibility of extrapolation of data to other adjacent beaches;
- (b) the distribution of stations along Queensland's coastline;
- (c) the need to correlate the COPE data with planned or existing data collection programmes.

1.3 Instrumentation

The COPE observers are supplied with a basic kit of recording instruments including:-

- 30 metre Tape
- Wind Meter
- Abney Level
- 1.5 metre Measuring stick
- Recording Forms
- Fluorescent Dye.

A graduated reference pole is installed on the beach to serve as the base point for all plan measurements and the control for vertical levelling.

1.4 Observers

The majority of COPE observers are volunteers, who may be local business people, local residents or school children. Some stations are operated by Government employees who carry out the observations as part of their official duties.

1.5 Accuracy

Individual observers differ in their subjective assessment of the various parameters recorded as part of the COPE programme. Wave parameters such as type, height, and angle of approach together with surf zone width and the location of the vegetation line all require visual assessment, the accuracy of which will vary from observer to observer and from recording to recording.

Although the Authority is confident that all observers make their observations to the best of their ability and accepts these observations without adjustment, the existence of random and non-random errors in the recorded data is to be expected.

Problems associated with the use of data containing these errors are minimised in two ways. Firstly, regular visits are made to the COPE stations by the Authority's COPE Field Officer to provide a check on any bias introduced into the recordings by incorrect observation procedures. Secondly, it has been found that, with a large number of observations taken on a regular basis, a reasonable assessment can be made of the average climatologies of the observed parameters provided the observation errors are random. A minimum recording period of three years has been adopted for the analysis and publication of the data. Five day moving averages are applied to observations of the various beach width and foreshore slope parameters to smooth out random errors.

For these reasons, the Authority is of the opinion that published COPE data can be used with confidence provided the above inherent limitations are recognised.

1.6 Presentation of Data

The purpose of this report is to present COPE data for the period 1976 to 1981 in a useful statistical form. No attempt has been made to interpret the observed data.

If this five year period is representative of the long term average meteorological conditions, then the statistics presented on wind, wave and beach movements can be regarded as typical. However, this five year period may be considered too short to be representative in terms of the average occurrence of extreme events such as cyclones and floods, and this should be taken into account when consideration is being given to the influence of such events on trends of long term beach behaviour.

2.0 STATION PARTICULARS

2.1 Location

Maroochydore is located within the Maroochy Shire, near the mouth of the Maroochy River. It is situated approximately 95 kilometres north of Brisbane. The location of the Maroochydore COPE station is shown in Figure 1.

2.2 Observers

This station has been operated by Mr J. Leadbetter, Mr J. Smith and Mr W. Bennett during the period July 1976 to August 1981. All observers were members of the Surf Life Saving Association and beach inspectors employed by Maroochy Shire Council. Recordings were taken as part of their normal duties.

2.3 Observed Parameters

The observers at this station commenced recording twice daily but this was discontinued very early in the recording period. Observers then usually recorded once daily at approximately 10.00 a.m. or 3.00 p.m. during the five year period 1976 to 1981.

This station has recorded:

- Wave Period
- Wave Height
- Wave Angle
- Wave Type
- Surf Zone Width
- Presence of Offshore Bar
- Wind Speed
- Wind Direction
- State of Tide
- Distance to Fixed Contour
- Distance to Vegetation Line
- Foreshore Slope
- Longshore Current Speed
- Longshore Current Direction.

In addition a sand sample was collected at the station each month, and since May 1977, a profile of the beach has usually been recorded monthly.

2.4 Tidal Information

Tidal information as presented below is essentially the same as that for Caloundra. Datum is low Water Datum.

M.H.W.S. 1.59 metres
 M.H.W.N. 1.27 metres
 M.S.L. 0.90 metres
 M.L.W.N. 0.53 metres
 M.L.W.S. 0.21 metres

A.H.D. is 0.97 metres above Low Water Datum.

2.5 Description of the Beach

The beach at Maroochydore has undergone frequent cycles of erosion and subsequent accretion. A rock revetment has been constructed in front of the Surf Life Saving Club and a field trial area has been established, on the frontal dune and hind dune areas next to the club. The beach exhibits the following characteristics:-

- Typical beach slope: Foreshore slope is in the range 1 in 28 to 1 in 10 (2° - 6°).
- Beach width: Typically 30 to 50 metres measured from the seaward toe of frontal dune to Low Water Mark.
- D50 sand size: 0.29 mm averaged over five years.
- Adjoining Landform: Well developed frontal dune/hind dune system.
- Vegetation: Beach spinifex (Spinifex sericeus) open grassland occurs on the seaward slope and crest of the frontal dune, Horsetail she-oak (Casuarina equisetifolia var. incana) low open-forest to woodland occurs on the crest and landward slope of the frontal dune and on hind dune areas. Coastal banksia (Banksia integrifolia) also occurs landward of the frontal dune.

2.6 Supervision of Station

The observers were instructed in the recording programme by the COPE Field Officer and the initial instruction period was followed up with visits to the station during the period of recordings presented in this report.

Installation and maintenance of the reference pole for this station has been carried out by Maroochy Shire Council and the Authority wishes to thank the Council for its assistance in all matters associated with the COPE project.

3.0 DATA

3.1 General

COPE data for this station for the five year period July 1976 to August 1981 are presented on the attached figures. The data have been analysed statistically and/or smoothed to reveal long term averages or trends. A brief description of each of the observed parameters is given below with the relevant figure references.

3.2 Wind

The observers recorded the wind speed at the beach using a hand held wind meter at 1.5 metres above beach level. Wind direction is estimated to the nearest compass sector.

A summary of annual wind speed and direction percentage occurrences are shown as a wind rose in Figure 2. Where applicable, morning and afternoon readings as well as the overall average are shown.

3.3 Waves

The average breaker height (trough to crest) is usually estimated to the nearest 0.1 metre. From experience this estimate has been found to be comparable with the equivalent deep water significant wave height.

The observers estimate the wave period by recording the time taken for eleven wave crests (the duration of 10 waves) to pass a point.

The wave direction is estimated as one of five direction sectors indicating the angle to the shoreline alignment from which the waves are approaching the beach. These sectors have been selected as:-

Sector 1	-	0° to 60°
Sector 2	-	61° to 85°
Sector 3	-	86° to 95°
Sector 4	-	96° to 120°
Sector 5	-	121° to 180°

Note: 0° is the beach alignment to the left of the observer when facing seaward, and at the COPE station this direction is approximately 5° east of true north.

Statistical representations of the observed wave data include:-

- (a) the percentage of wave height recordings which exceed any given wave height for all directions combined (Figure 3).

- (b) the percentage occurrence of various combinations of wave heights and periods and directions (Figure 4 and Figure 5).
- (c) surf zone width with an indication of the existence or otherwise of an offshore bar (Figures 6 to 14.)
- (d) tabulation of the occurrence of various wave heights, periods, types and directions (Tables 1 to 6).

3.4 Longshore Currents

The observers measured the distance parallel to the shoreline that a dye patch in the surf zone moved in one minute. Current direction is either upcoast or downcoast, upcoast being to the left when facing the sea from the beach.

The readings are converted to a velocity which is plotted on a daily basis (Figure 15 to Figure 22). Mean upcoast and downcoast components and the overall annual means are also presented.

3.5 Beach Profile Parameters

Beach profile parameters were measured using an Abney level, tape measure and reference pole. These include:

- Distance from reference pole to the 1.5 metre fixed contour (relative to A.H.D.).
- Distance from reference pole to the vegetation line.
- The foreshore slope.

Changes in these parameters with time indicate how the beach moves in response to varying wave attack. Plots of these parameters are shown in Figures 24 to 28. NOTE: No beach profile parameters were recorded in 1981.

3.6 Monthly Beach Profiles

Beach profiles are normally taken at the beginning of each month. However, should the beach undergo appreciable erosion or accretion during the month, then the observer is requested to take another beach profile. Monthly beach profiles are shown in Figures 29 and 30. NOTE: No monthly beach profiles were recorded in 1981.

TABLE 1
MONTHLY AND ANNUAL
MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION
OCCURRENCES

Maroochydore

Year 1976

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction											
			Wave Type					Wave Direction						
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm	
JANUARY														
FEBRUARY														
MARCH														
APRIL														
MAY														
JUNE														
JULY	10.1	0.99	-	20.8	-	79.2	-	-	4.2	37.5	58.3	-	-	
AUGUST	8.0	0.30	-	-	-	100.0	-	-	-	100.0	-	-	-	
SEPTEMBER	-	-	-	-	-	-	-	-	-	-	-	-	-	
OCTOBER	7.7	0.55	66.6	16.7	-	16.7	-	-	16.7	83.3	-	-	-	
NOVEMBER	9.5	0.68	52.4	47.6	-	-	-	-	13.6	86.4	-	-	-	
DECEMBER	9.9	0.61	57.1	38.1	-	4.8	-	-	9.1	77.3	13.6	-	-	
WHOLE YEAR	9.6	0.74	37.0	32.9	0.0	30.1	0.0	0.0	9.3	68.0	22.7	0.0	0.0	

SP - Spilling
 PL - Plunging
 SP/PL - Combined Spilling and Plunging

TABLE 2
MONTHLY AND ANNUAL
MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION
OCCURRENCES

Maroochydore

Year 1977

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	10.0	1.13	52.6	21.1	-	26.3	-	-	-	89.5	10.5	-	-
FEBRUARY	10.4	1.13	75.0	10.0	5.0	10.0	-	-	-	100.0	-	-	-
MARCH	10.3	1.25	60.9	8.7	-	30.4	-	-	-	100.0	-	-	-
APRIL	10.5	0.92	100.0	-	-	-	-	-	-	100.0	-	-	-
MAY	10.3	1.03	74.1	-	-	25.9	-	-	-	100.0	-	-	-
JUNE	10.8	0.66	95.5	-	-	4.5	-	-	4.3	95.7	-	-	-
JULY	10.8	0.74	81.5	-	-	18.5	-	-	-	100.0	-	-	-
AUGUST	12.2	0.68	77.8	-	-	22.2	-	-	-	100.0	-	-	-
SEPTEMBER	12.4	0.52	100.0	-	-	-	-	-	8.3	91.7	-	-	-
OCTOBER	10.7	0.49	100.0	-	-	-	-	-	9.5	85.7	4.8	-	-
NOVEMBER	10.8	0.67	90.9	-	-	9.1	-	-	-	100.0	-	-	-
DECEMBER	9.6	0.62	87.0	-	-	13.0	-	-	-	82.6	17.4	-	-
WHOLE YEAR	10.8	0.81	82.8	2.9	0.4	13.9	0.0	0.0	1.8	95.6	2.6	0.0	0.0

SP - Spilling

PL - Plunging

SP/PL - Combined Spilling and Plunging

TABLE 3
MONTHLY AND ANNUAL
MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION
OCCURRENCES

Maroochydore

Year 1978

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction											
			Wave Type					Wave Direction						
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm	
JANUARY	9.9	0.68	95.0	-	-	5.0	-	-	-	5.0	95.0	-	-	-
FEBRUARY	9.5	0.71	92.9	-	-	7.1	-	-	-	-	100.0	-	-	-
MARCH	8.8	0.84	100.0	-	-	-	-	-	-	-	100.0	-	-	-
APRIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JUNE	11.1	0.85	9.1	-	-	90.9	-	-	-	-	100.0	-	-	-
JULY	10.9	0.92	18.2	9.1	-	72.7	-	-	-	-	100.0	-	-	-
AUGUST	9.1	0.62	16.7	11.1	-	72.2	-	-	-	-	94.4	5.6	-	-
SEPTEMBER	9.2	0.49	72.7	-	-	27.3	-	-	-	-	100.0	-	-	-
OCTOBER	8.6	0.51	92.9	-	-	7.1	-	-	-	7.2	71.4	21.4	-	-
NOVEMBER	8.2	0.61	56.3	18.7	-	25.0	-	-	-	6.3	87.4	6.3	-	-
DECEMBER	8.6	0.39	66.7	-	-	33.3	-	-	-	33.3	66.7	-	-	-
WHOLE YEAR	4.9	0.22	61.8	4.6	0.0	33.6	0.0	0.0	0.0	4.6	91.6	3.8	0.0	0.0

SP - Spilling
 PL - Plunging
 SP/PL - Combined Spilling and Plunging

TABLE 4
MONTHLY AND ANNUAL
MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION
OCCURRENCES

Maroochydore

Year 1979

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	8.6	0.66	-	-	-	100.0	-	-	-	44.4	55.6	-	-
FEBRUARY	8.6	1.12	33.3	-	-	66.7	-	-	13.3	33.3	46.7	6.7	-
MARCH	10.2	0.66	66.7	-	-	33.3	-	-	-	61.9	38.1	-	-
APRIL	11.8	0.94	42.1	36.8	-	21.1	-	-	-	84.2	15.8	-	-
MAY	10.5	0.62	100.0	-	-	-	-	-	-	100.0	-	-	-
JUNE	10.6	1.15	20.0	-	-	80.0	-	-	20.0	53.3	26.7	-	-
JULY	10.8	1.03	61.1	-	-	38.9	-	-	16.7	44.4	38.9	-	-
AUGUST	11.4	0.57	88.9	-	-	11.1	-	-	22.2	66.7	11.1	-	-
SEPTEMBER	9.5	0.90	81.3	-	-	18.7	-	-	25.0	50.0	25.0	-	-
OCTOBER	8.0	0.76	47.1	-	-	52.9	-	-	17.6	67.1	35.3	-	-
NOVEMBER	8.5	0.62	88.2	-	-	11.8	-	-	53.0	23.5	23.5	-	-
DECEMBER	-	-	-	-	-	-	-	-	-	-	-	-	-
WHOLE YEAR	9.8	0.85	55.6	4.4	0.0	40.0	0.0	0.0	16.3	52.5	30.6	0.6	0.0

SP - Spilling

PL - Plunging

SP/PL - Combined Spilling and Plunging

TABLE 5
MONTHLY AND ANNUAL
MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION
OCCURENCES

Maroochydore

Year 1980

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	-	-	-	-	-	-	-	-	-	-	-	-	-
FEBRUARY	-	-	-	-	-	-	-	-	-	-	-	-	-
MARCH	-	-	-	-	-	-	-	-	-	-	-	-	-
APRIL	-	-	-	-	-	-	-	-	-	-	-	-	-
MAY	-	-	-	-	-	-	-	-	-	-	-	-	-
JUNE	-	-	-	-	-	-	-	-	-	-	-	-	-
JULY	9.7	0.89	-	25.0	-	75.0	-	-	-	62.5	37.5	-	-
AUGUST	8.7	0.94	-	-	-	100.0	-	-	-	88.2	11.8	-	-
SEPTEMBER	8.0	0.69	33.3	-	-	66.7	-	-	33.3	66.7	-	-	-
OCTOBER	8.5	0.85	66.7	-	-	33.3	-	-	20.0	66.7	13.3	-	-
NOVEMBER	8.4	1.02	-	-	-	100.0	-	-	-	60.0	40.0	-	-
DECEMBER	-	-	-	-	-	-	-	-	-	-	-	-	-
WHOLE YEAR	8.6	0.85	25.0	3.3	0.0	71.7	0.0	0.0	13.3	71.7	15.0	0.0	0.0

SP - Spilling

PL - Plunging

SP/PL - Combined Spilling and Plunging

TABLE 6

MONTHLY AND ANNUAL

MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND TYPE/WAVE DIRECTION
OCCURENCES

Maroochydore

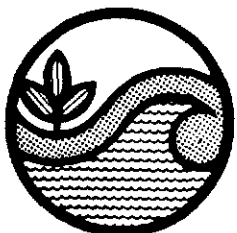
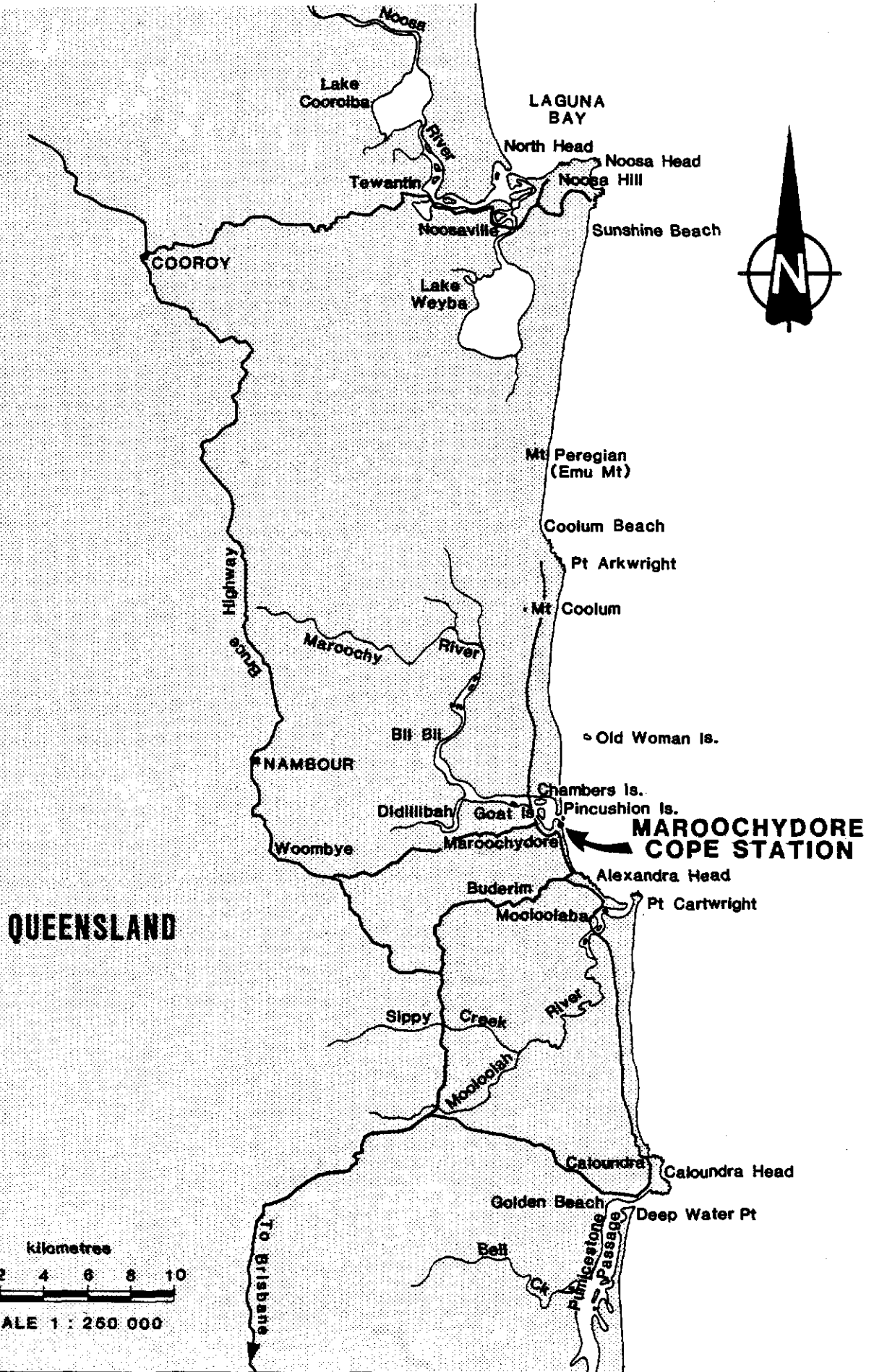
Year 1981

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction											
			Wave Type					Wave Direction						
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm	
JANUARY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FEBRUARY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MARCH	-	-	-	-	-	-	-	-	-	-	-	-	-	-
APRIL	9.4	1.20	38.9	11.1	-	50.0	-	-	5.6	83.2	5.6	5.6	-	-
MAY	9.0	1.14	10.5	21.1	-	68.4	-	-	18.8	12.5	56.2	12.5	-	-
JUNE	9.5	0.60	16.7	16.7	-	66.6	-	-	40.0	20.0	40.0	-	-	-
JULY	8.1	0.82	12.5	-	-	87.5	-	-	50.0	16.7	33.3	-	-	-
AUGUST	8.0	0.84	60.0	-	-	40.0	-	-	53.8	7.7	38.5	-	-	-
SEPTEMBER														
OCTOBER														
NOVEMBER														
DECEMBER														
WHOLE YEAR	8.9	1.00	30.3	10.6	0.0	59.1	0.0	0.0	27.5	34.5	32.8	5.2	0.0	

SP - Spilling

PL - Plunging

SP/PL - Combined Spilling and Plunging



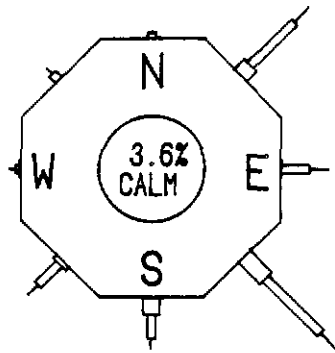
Beach Protection Authority

LOCALITY PLAN

COPE
Maroochydores

Figure 1
C 20.1

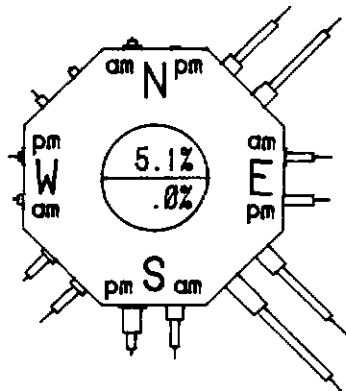
ALL OBSERVATIONS



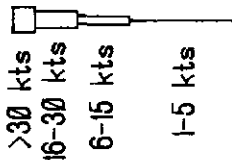
Total No. of Observations : 760

MORNING - AFTERNOON OBSERVATIONS

NOTES :
 Figures in Central Circle
 Represent Percentage
 of CALM Observations.
 Upper Figure for AM
 Lower Figure for PM



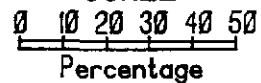
LEGEND



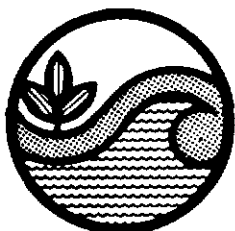
No. of Morning Observations : 533
 No. of Afternoon Observations : 227

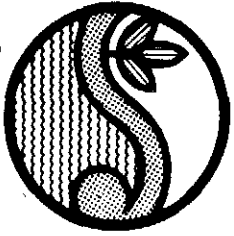
Mean Time :- Morning Obs : 1001 hrs
 Mean Time :- Afternoon Obs : 1456 hrs

SCALE



WIND DATA - JULY 1976 to AUG 1981





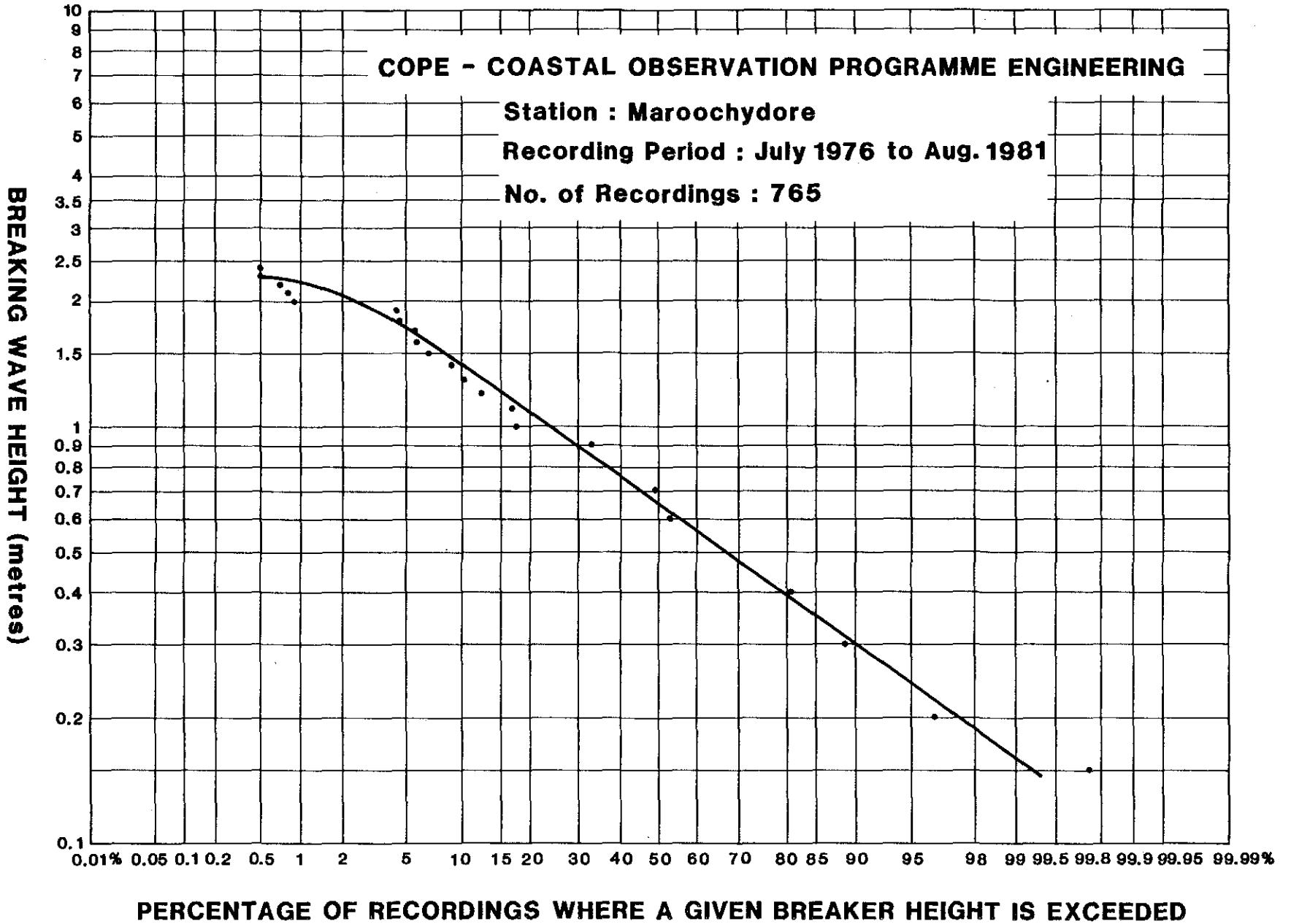
**WAVE HEIGHT % EXCEEDANCE
ALL DATA**

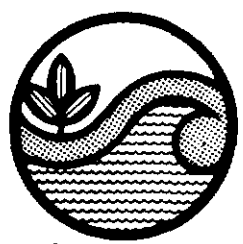
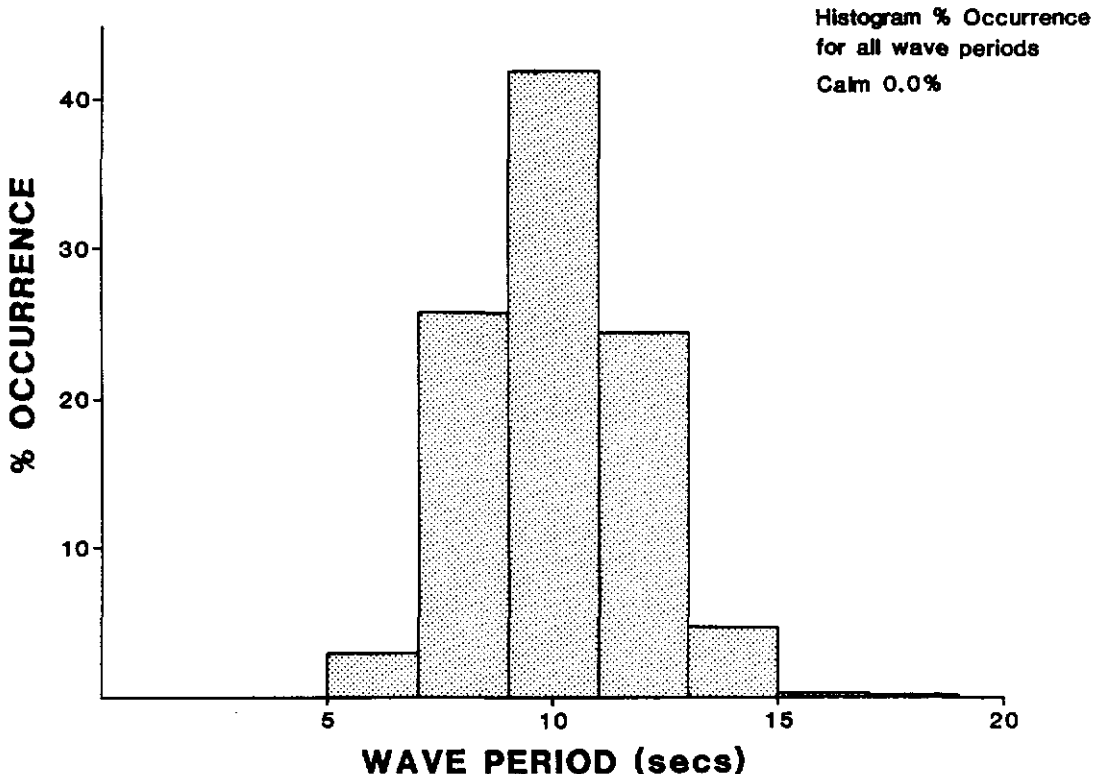
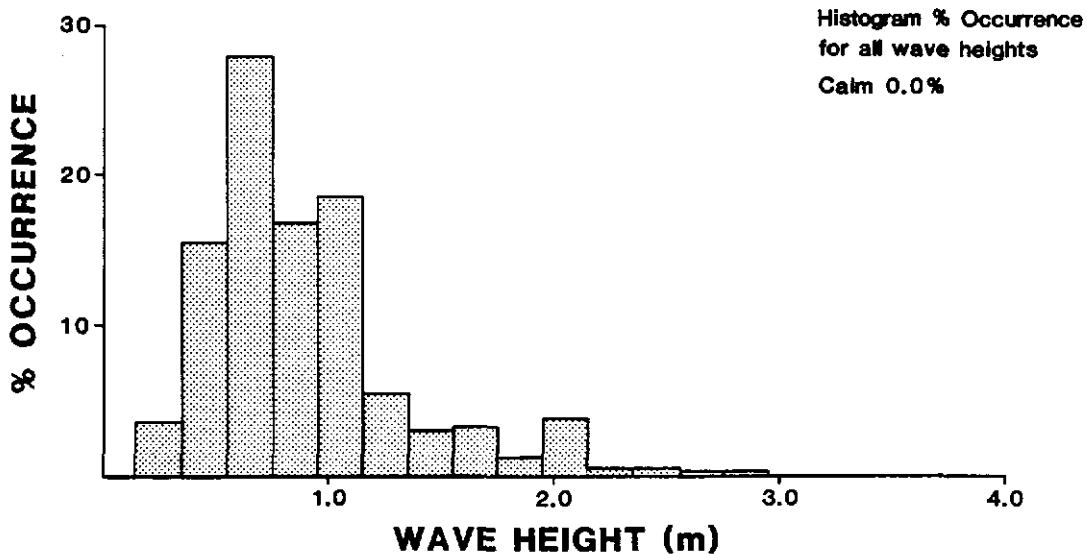
COPE

Maroochydore

Figure 3

C 20.1



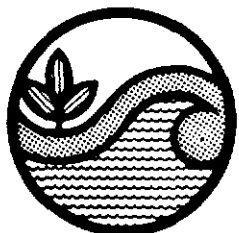
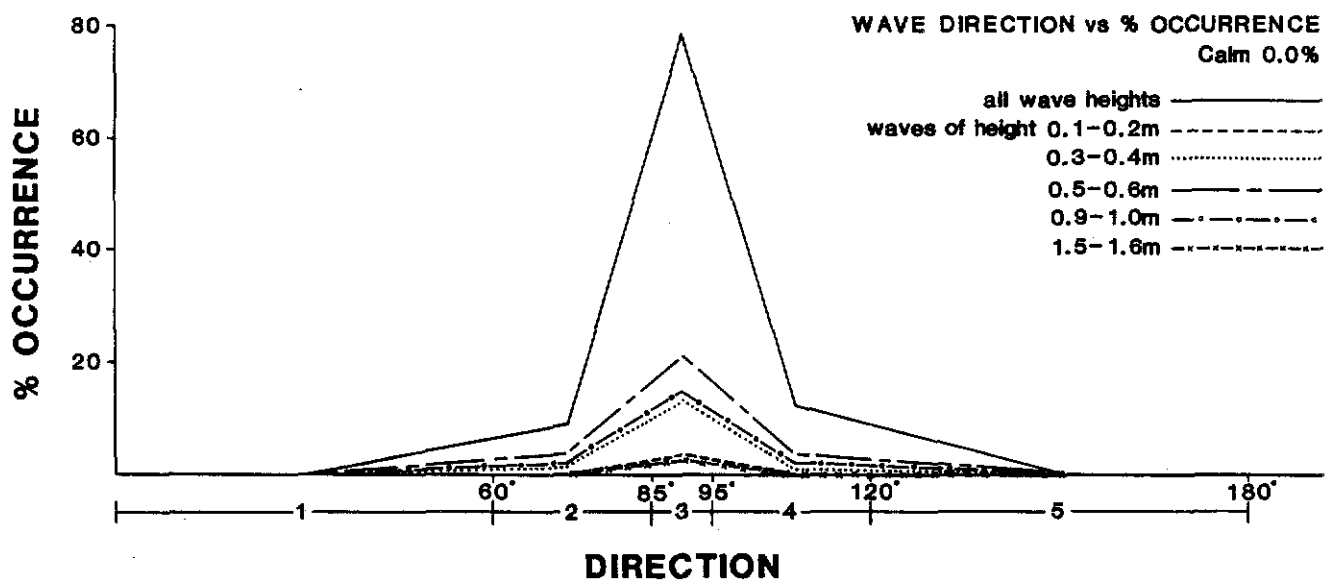
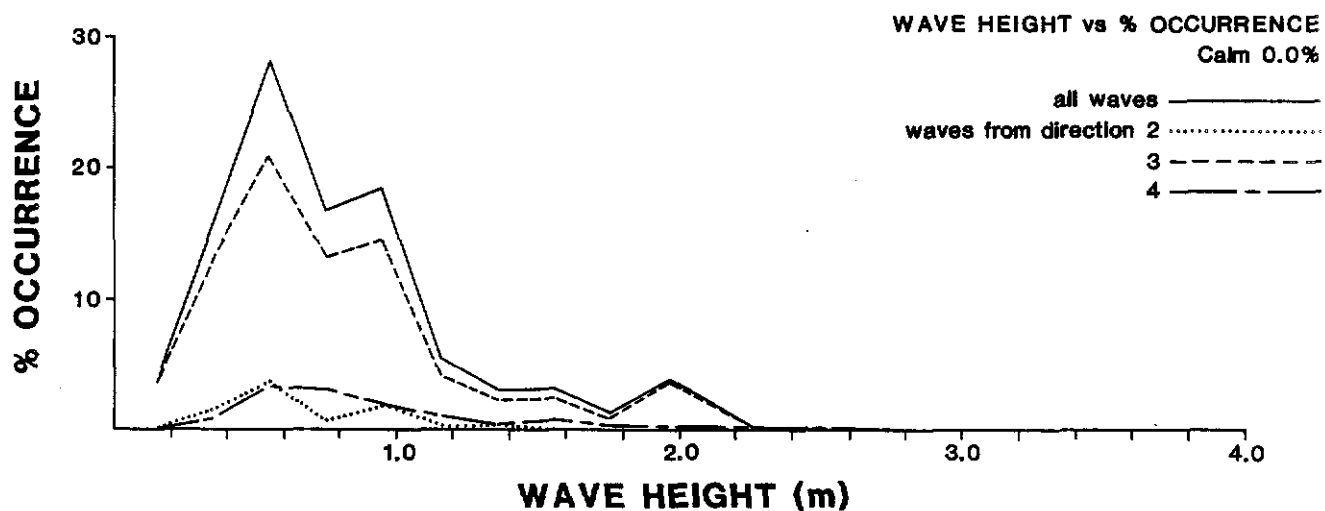
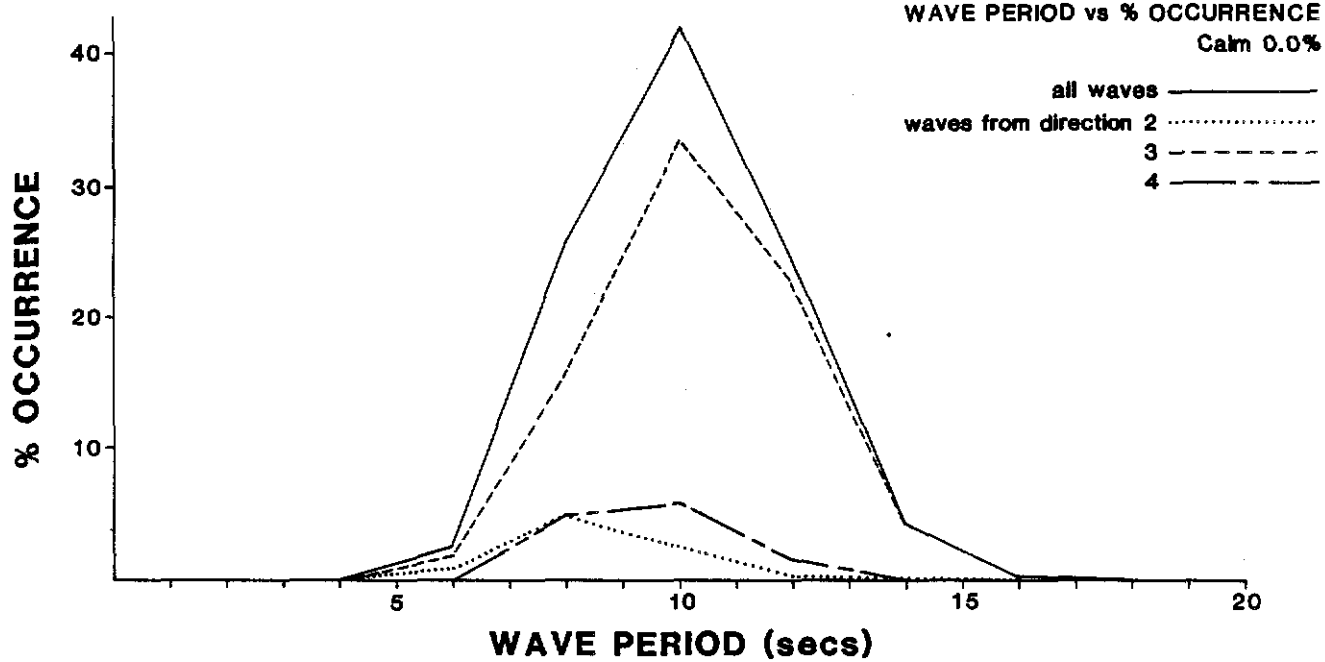


Beach Protection Authority

**PERCENTAGE OCCURRENCE
OF WAVE HEIGHT AND WAVE PERIOD
ALL DATA**

COPE
Maroochydore

Figure 4
C 20.1



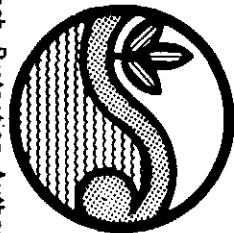
Beach Protection Authority

**WAVE DIRECTION ANALYSIS
ALL DATA**

COPE
Maroochydore

Figure 5

C 20.1



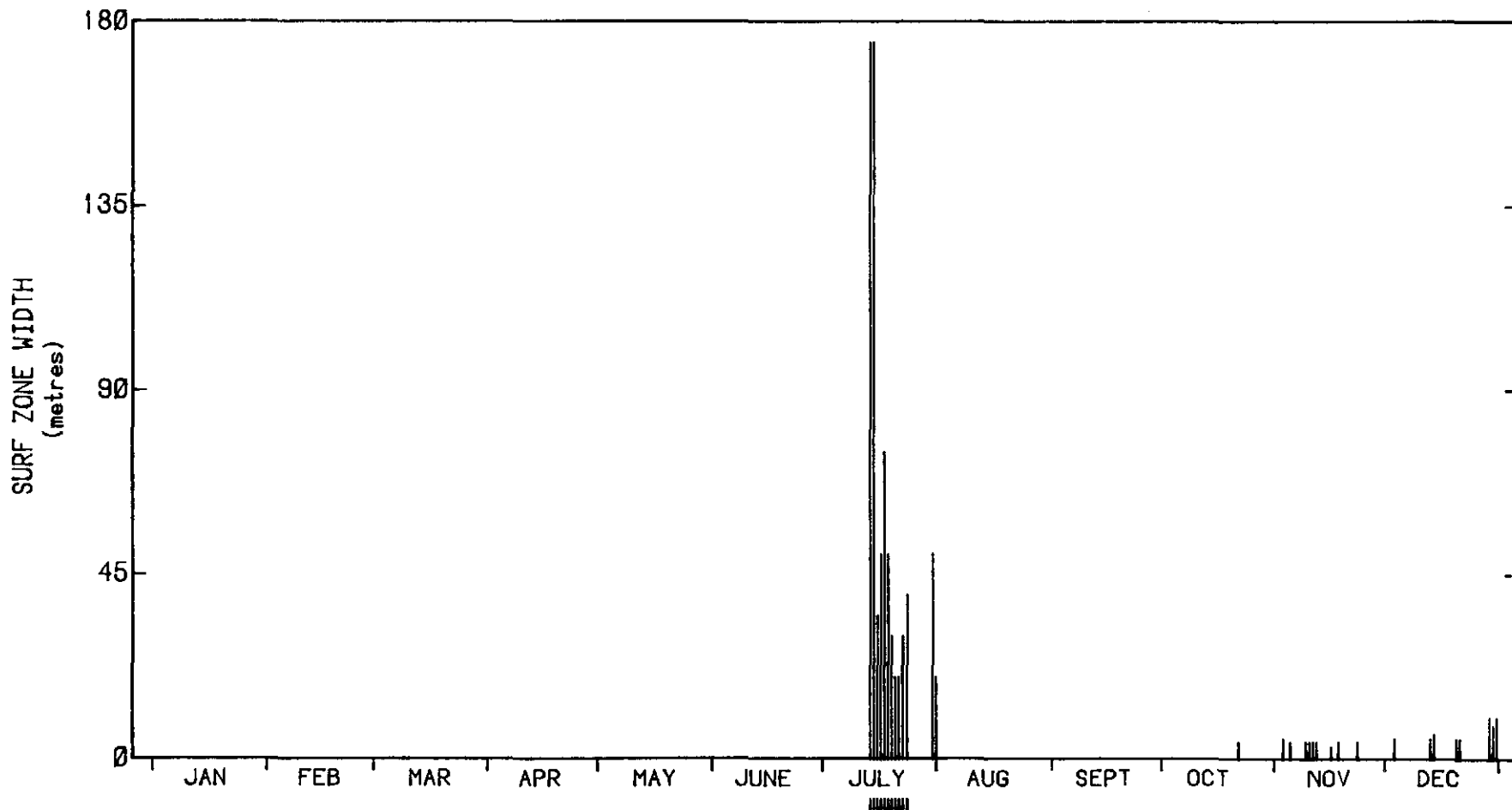
SURF ZONE WIDTH - MORNING 1976

COPE - Coastal Observation Programme Engineering

MAROOCHYDORE

MAROOCHY SHIRE

0701



SURF ZONE WIDTH SUMMARY - 1976

No. of Observations : 31

MORNING OBSERVATIONS

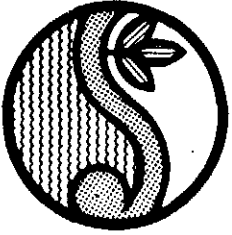
Mean Surf Zone Width = 27.9 m

■ Indicates Offshore Bar Present

COPE
Maroochydore

Figure 6

C 20.1



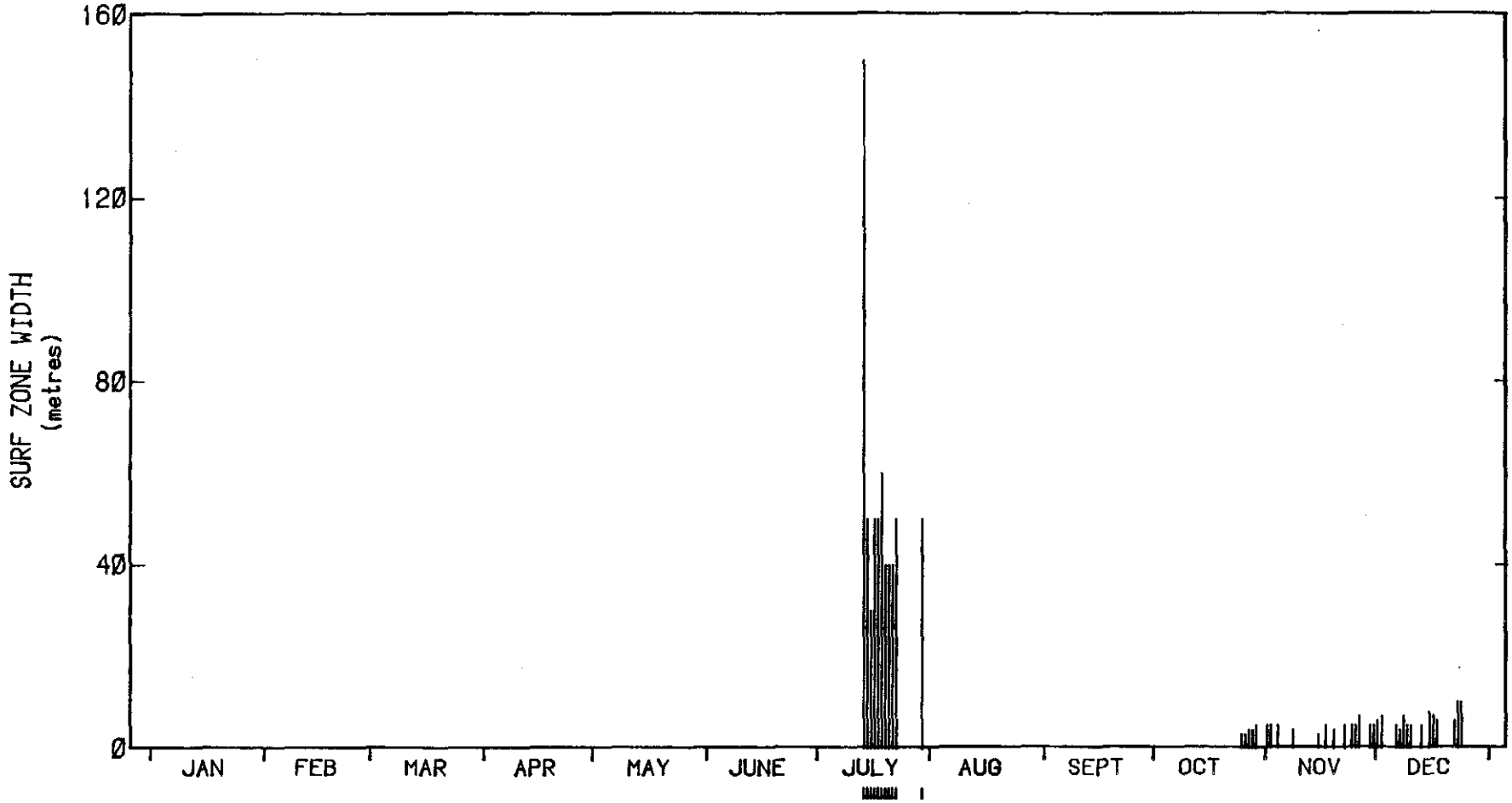
SURF ZONE WIDTH - AFTERNOON 1976

COPE - Coastal Observation Programme Engineering

MAROOCHYDORE

MAROOCHY SHIRE

0701



SURF ZONE WIDTH SUMMARY - 1976

No. of Observations : 43

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 18.2 m

■ Indicates Offshore Bar Present

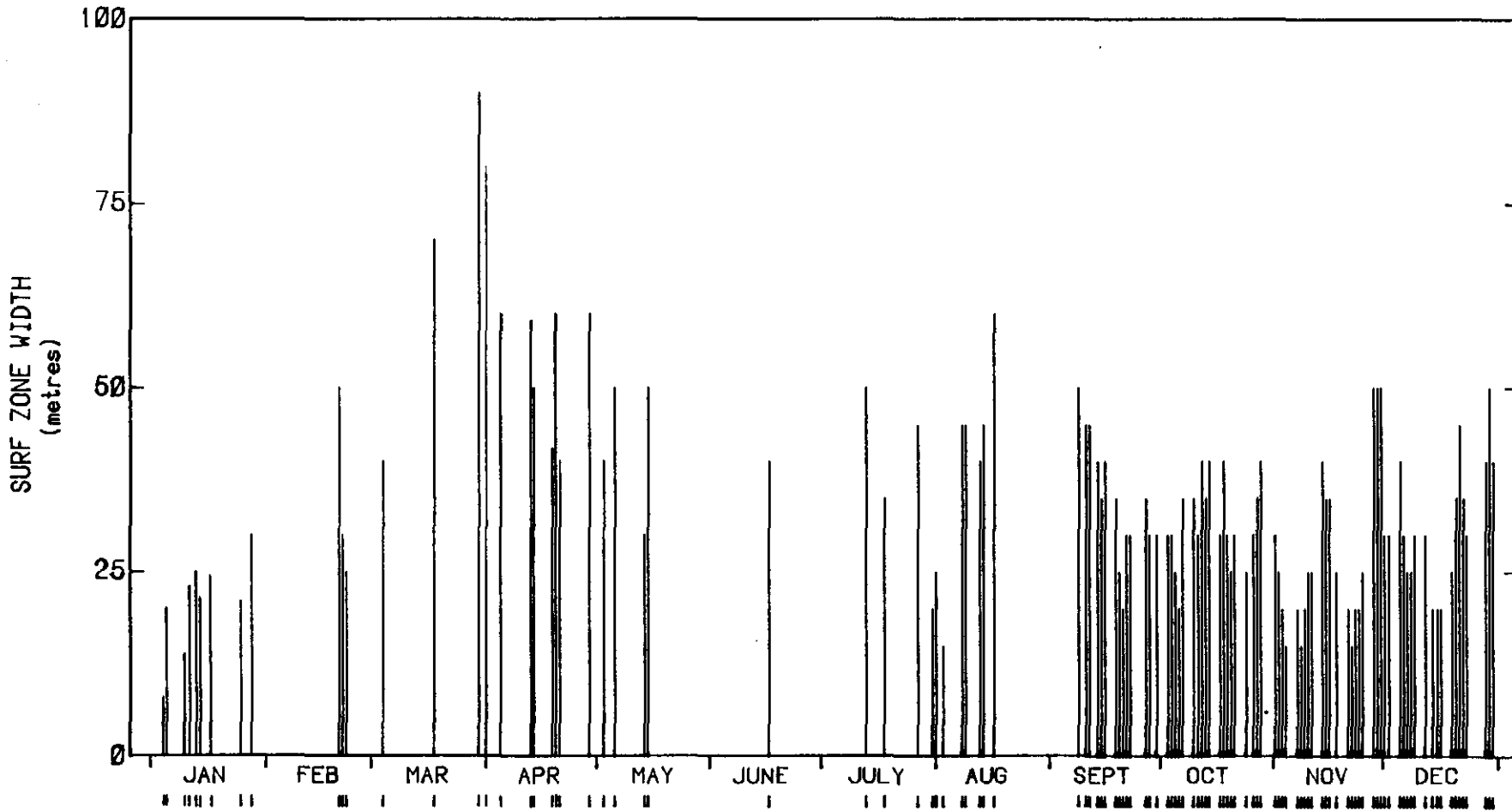
COPE
Maroochydore

Figure 7

C 20.1



SURF ZONE WIDTH - MORNING 1977



SURF ZONE WIDTH SUMMARY - 1977

No. of Observations : 113

MORNING OBSERVATIONS

Mean Surf Zone Width = 34.4 m

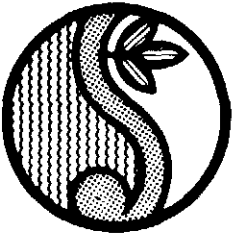
■ Indicates Offshore Bar Present

COPE

Maroochydore

Figure 8

C 20.1



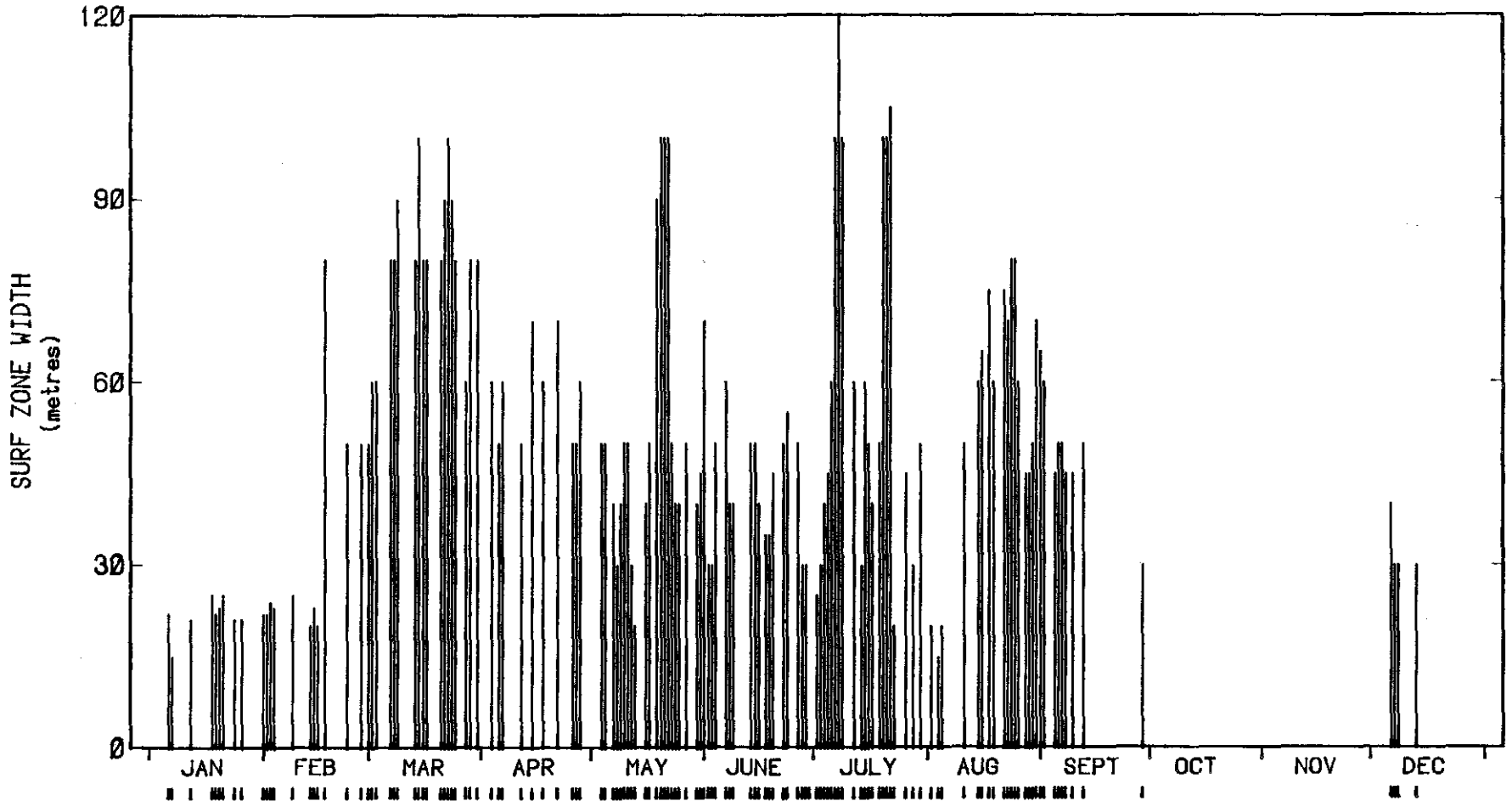
SURF ZONE WIDTH - AFTERNOON 1977

COPE - Coastal Observation Programme Engineering

MAROOCHYDORE

MAROOCHY SHIRE

0701



SURF ZONE WIDTH SUMMARY - 1977

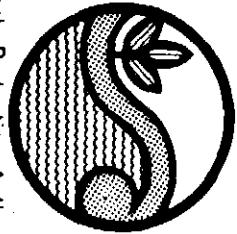
No. of Observations : 139

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 51.9 m

■ Indicates Offshore Bar Present

COPE
Maroochydore
Figure 9
C 20.1



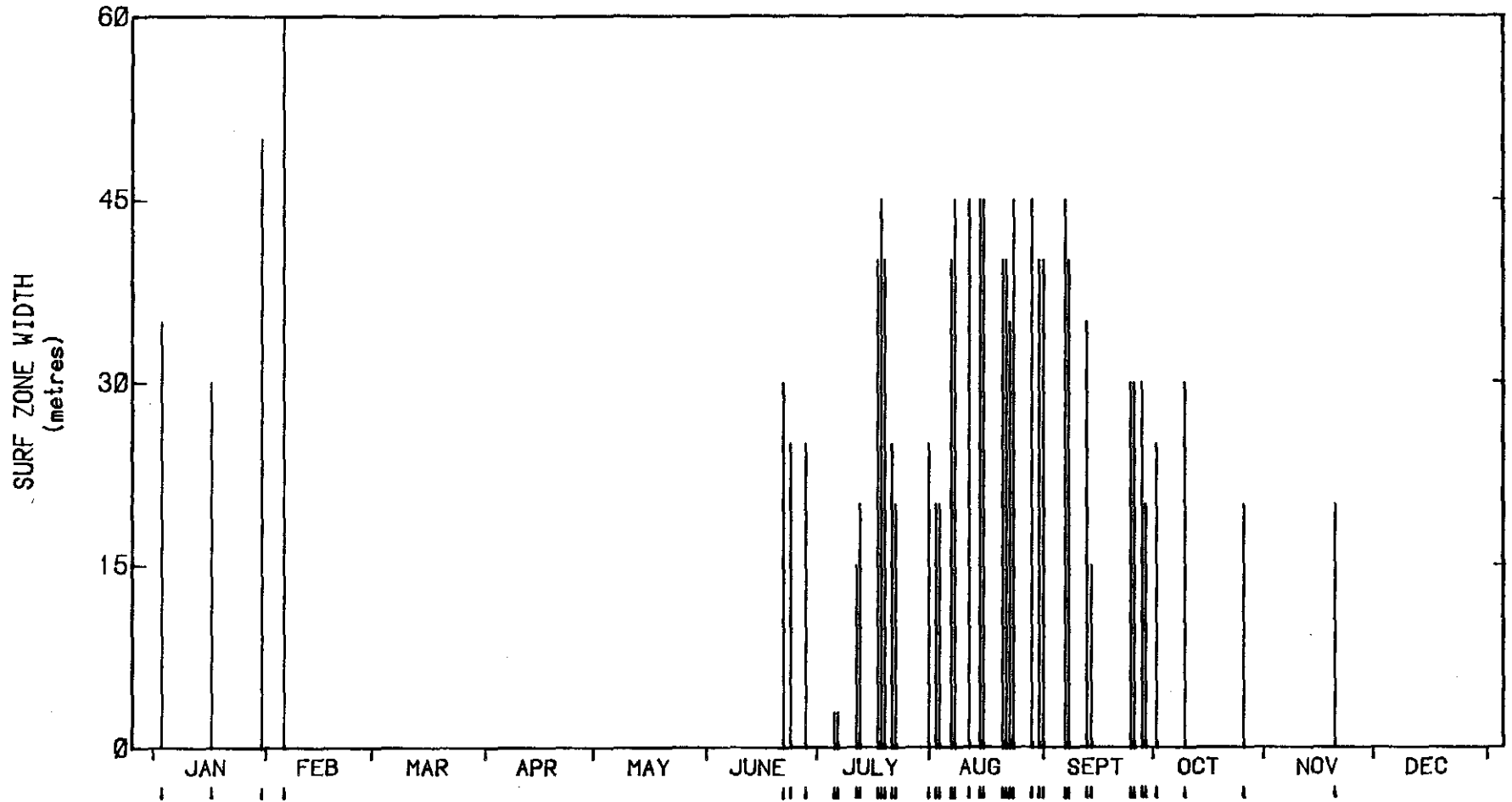
SURF ZONE WIDTH - AFTERNOON 1978

COPE - Coastal Observation Programme Engineering

MAROOCHYDORE

MAROOCHY SHIRE

0701



SURF ZONE WIDTH SUMMARY - 1978

No. of Observations : 43

AFTERNOON OBSERVATIONS

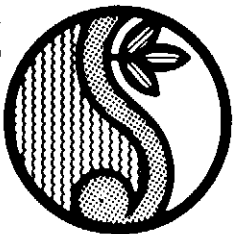
Mean Surf Zone Width = 32.0 m

■ Indicates Offshore Bar Present

COPE
Maroochydore

Figure 11

C 20.1



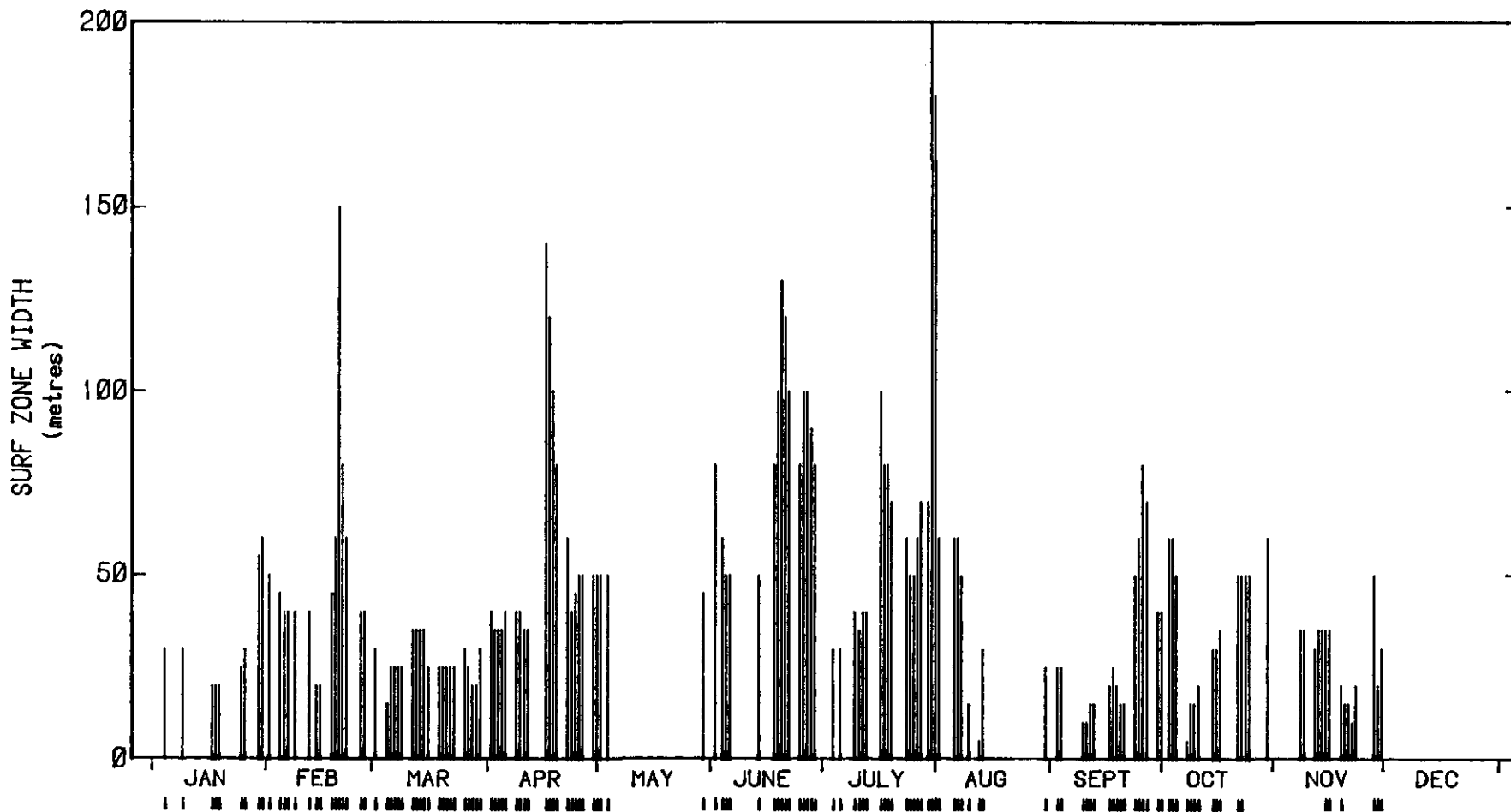
COPE - Coastal Observation Programme Engineering

MAROOCHYDORE

MAROOCHY SHIRE

0701

SURF ZONE WIDTH - MORNING 1979



SURF ZONE WIDTH SUMMARY - 1979

No. of Observations : 157

MORNING OBSERVATIONS

Mean Surf Zone Width = 47.3 m

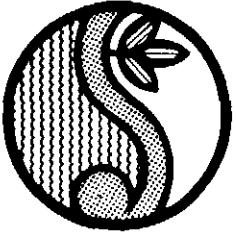
■ Indicates Offshore Bar Present

COPE

Maroochydore

Figure 12

C 20.1



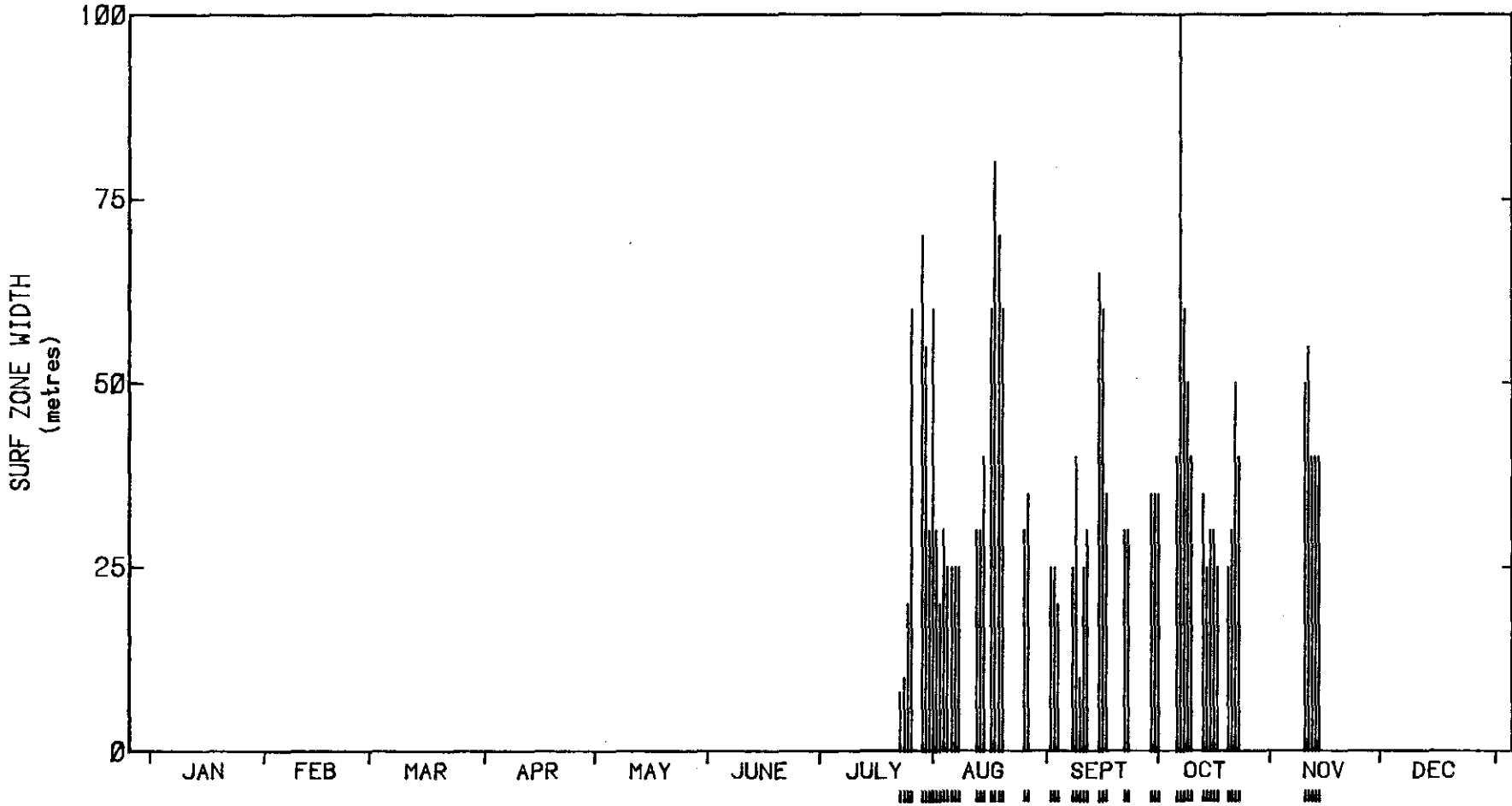
SURF ZONE WIDTH - MORNING 1980

COPE - Coastal Observation Programme Engineering

MAROOCHYDORE

MAROOCHY SHIRE

0701



SURF ZONE WIDTH SUMMARY - 1980

No. of Observations : 60

MORNING OBSERVATIONS

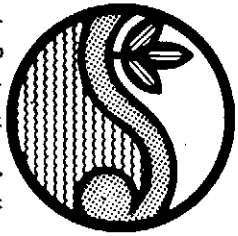
Mean Surf Zone Width = 38.0 m

■ Indicates Offshore Bar Present

COPE
Maroochydore

Figure 13

C 20.1



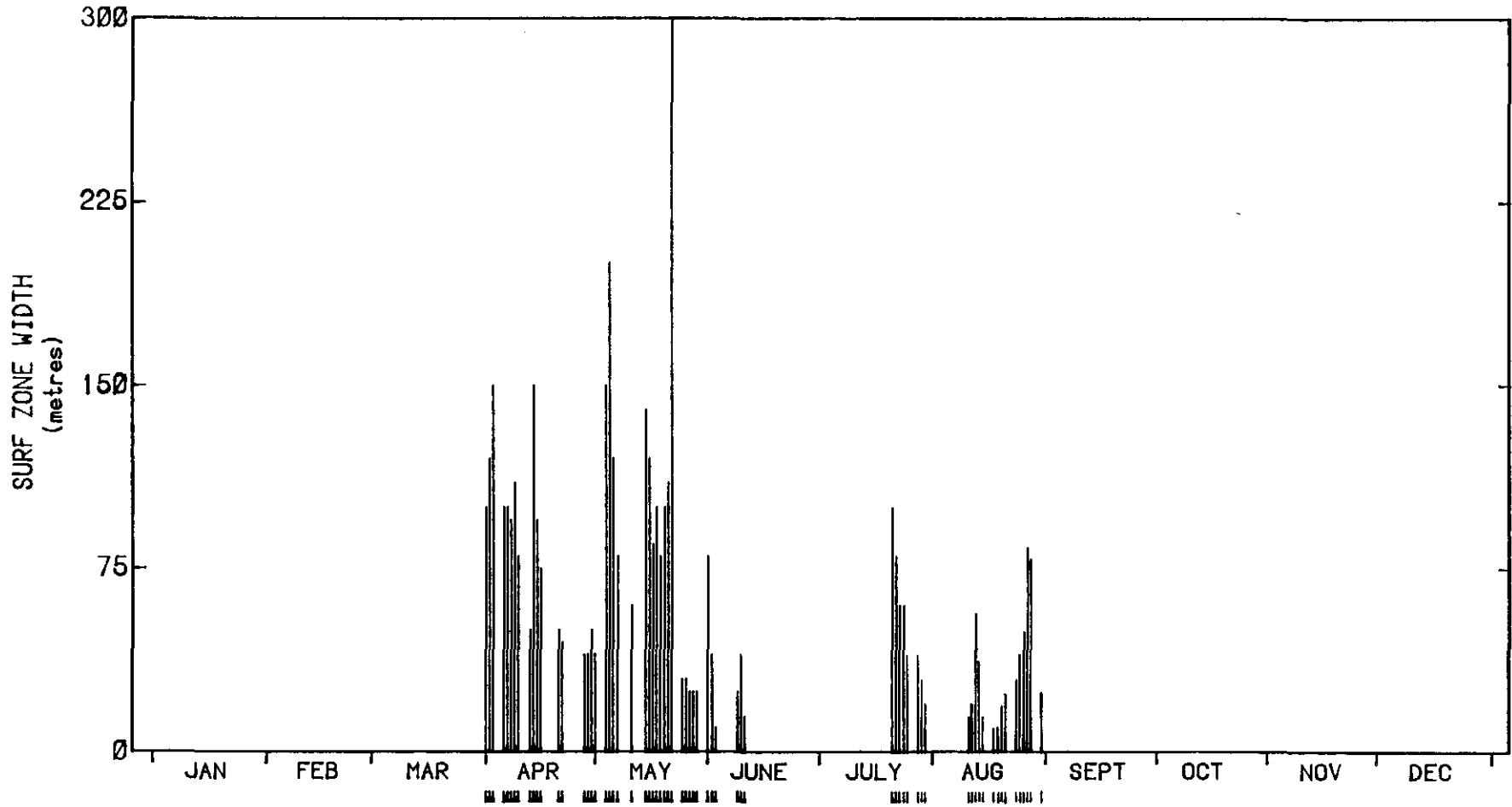
SURF ZONE WIDTH - MORNING 1981

COPE - Coastal Observation Programme Engineering

MAROOCHYDORE

MAROOCHY SHIRE

0701



SURF ZONE WIDTH SUMMARY - 1981

No. of Observations : 65

MORNING OBSERVATIONS

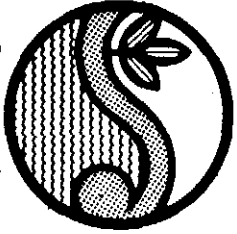
Mean Surf Zone Width = 68.2 m

■ Indicates Offshore Bar Present

COPE
Maroochydore

Figure 14

C 20.1



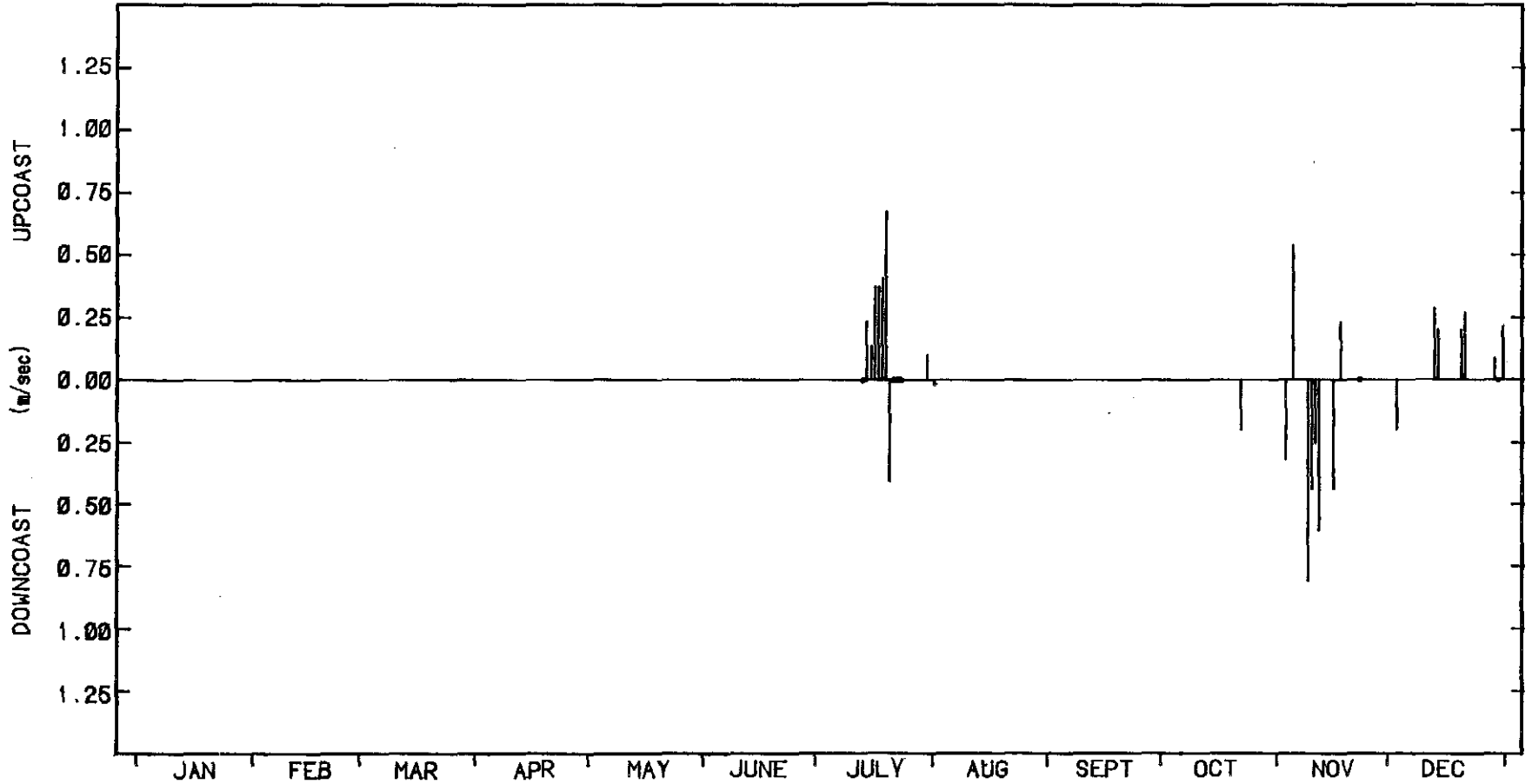
LITTORAL CURRENTS - MORNING 1976

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORE

0701



LITTORAL CURRENT SUMMARY - 1976

Mean Vel = 0.020 m/sec (up)

Mean Upcoast Vel = 0.286 m/sec

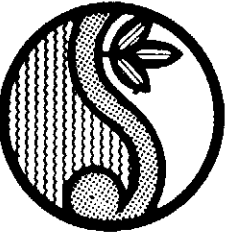
Mean Downcoast Vel = 0.365 m/sec

MORNING OBSERVATIONS - (31 recordings)

COPE
Maroochydore

Figure 15

C 20.1



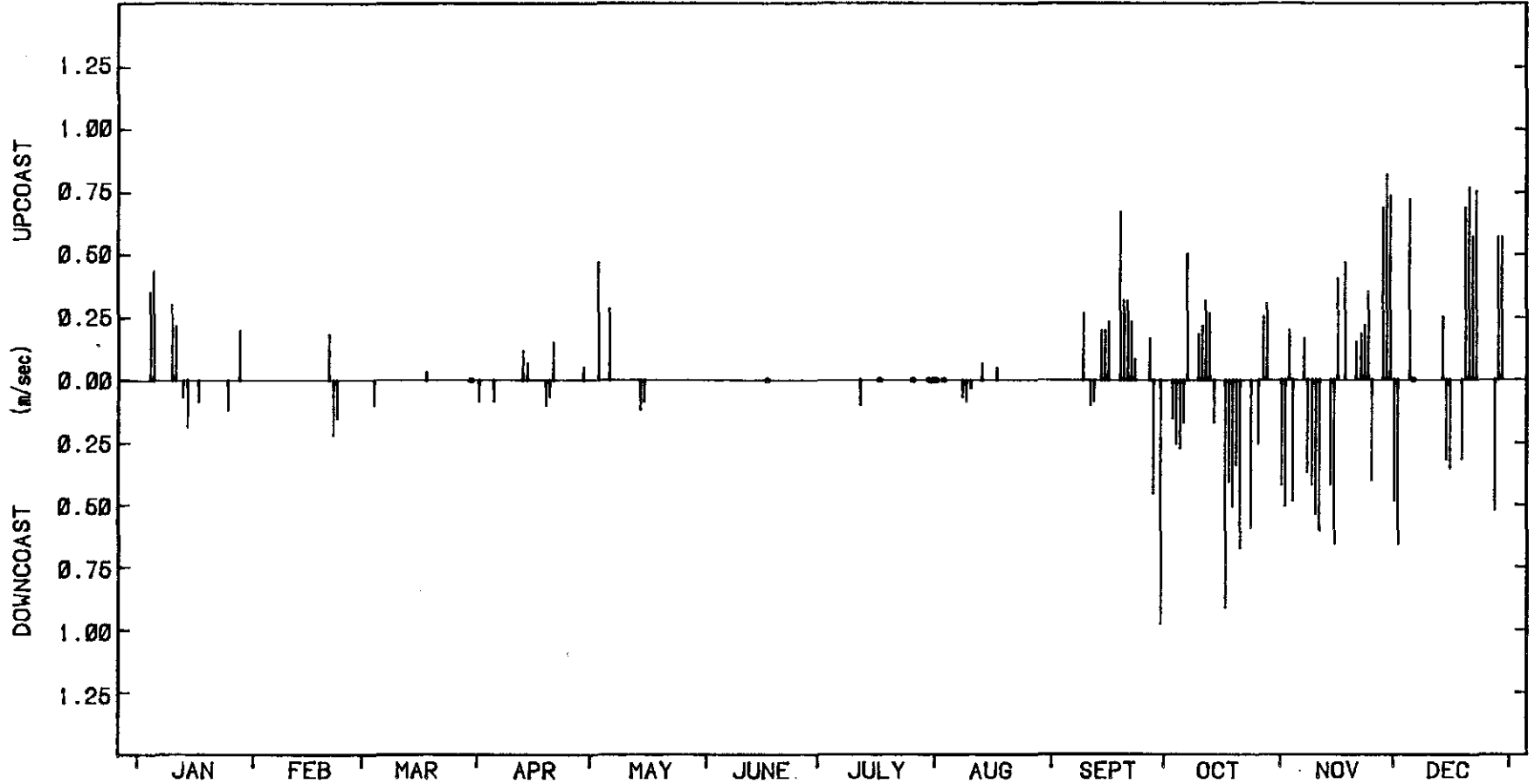
LITTORAL CURRENTS - MORNING 1977

COPE - Coastal Observation
Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORE

0701



LITTORAL CURRENT SUMMARY - 1977

Mean Vel = 0.014 m/sec (up)

Mean Upcoast Vel = 0.332 m/sec

Mean Downcoast Vel = 0.314 m/sec

MORNING OBSERVATIONS - (109 recordings)

COPE
Maroochydore

Figure 17

C 20.1



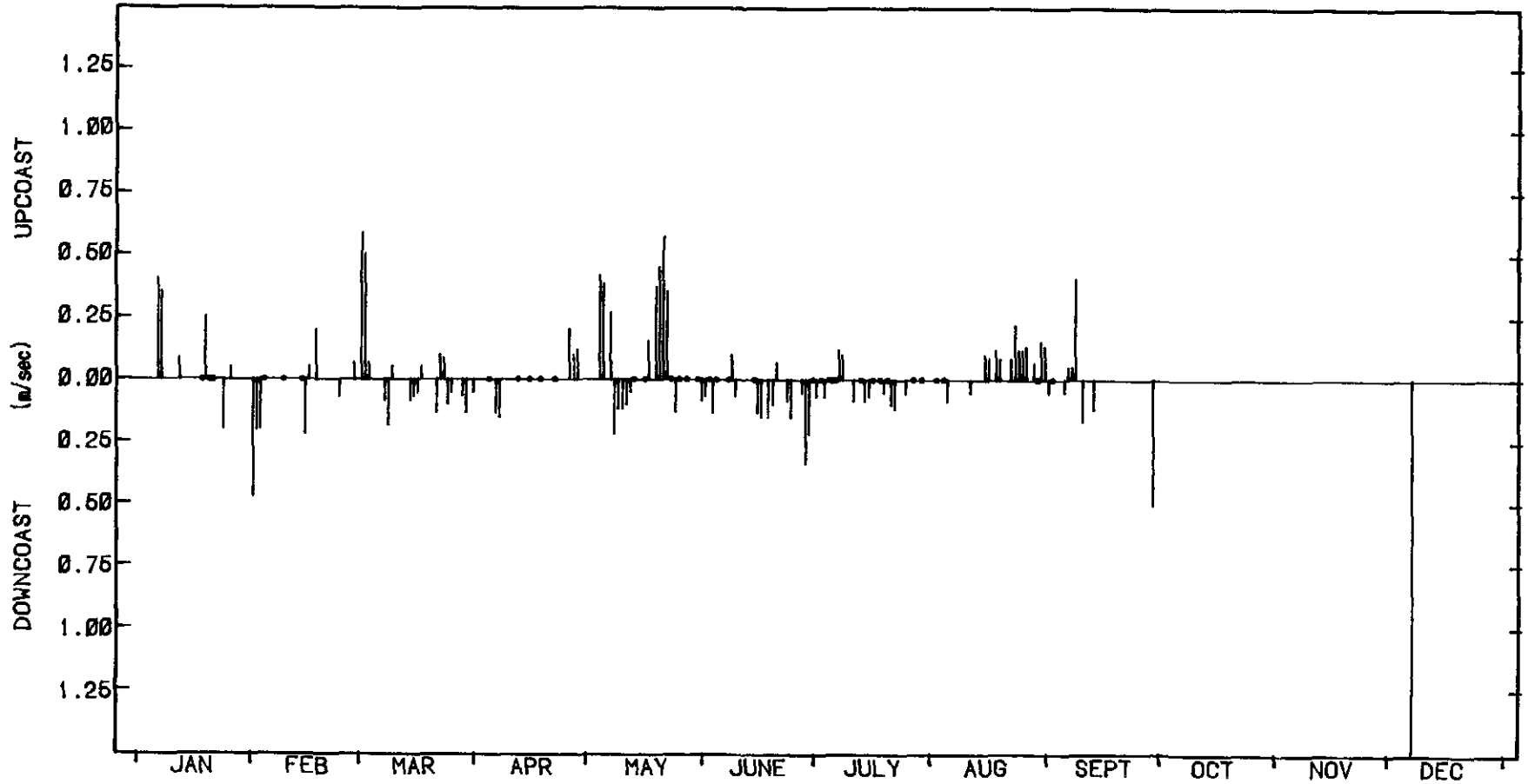
LITTORAL CURRENTS - AFTERNOON 1977

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORE

0701



LITTORAL CURRENT SUMMARY - 1977

Mean Vel = 0.001 m/sec (up)

Mean Upcoast Vel = 0.190 m/sec

Mean Downcoast Vel = 0.153 m/sec

AFTERNOON OBSERVATIONS - (136 recordings)

COPE

Maroochydore

Figure 18

C 20.1



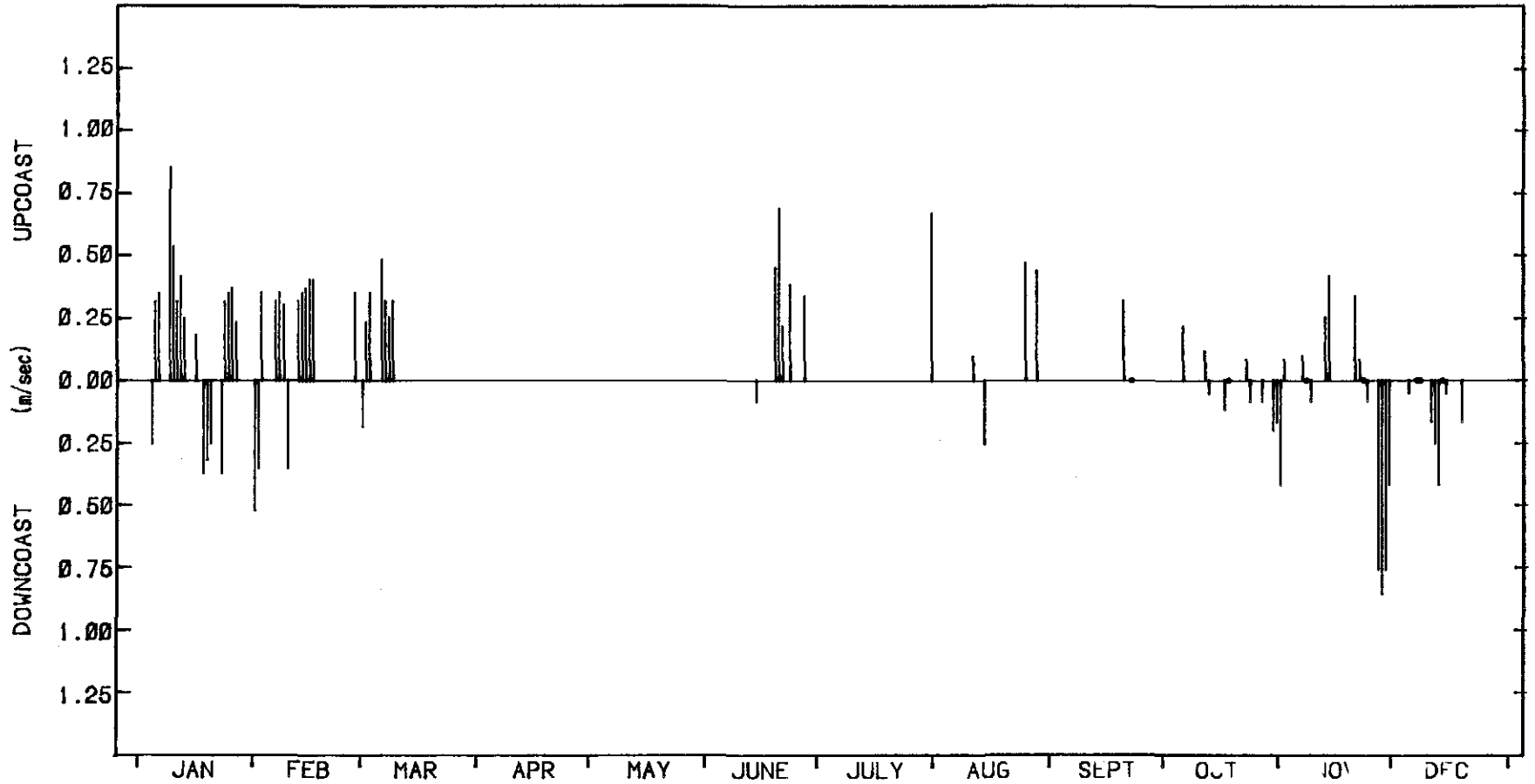
LITTORAL CURRENTS - MORNING 1978

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORE

0701



LITTORAL CURRENT SUMMARY - 1978

Mean Vel = 0.086 m/sec (up)

Mean Upcoast Vel = 0.333 m/sec

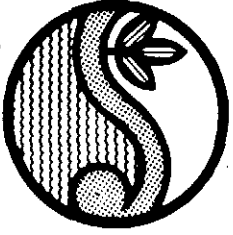
Mean Downcoast Vel = 0.281 m/sec

MORNING OBSERVATIONS - (84 recordings)

COPE
Maroochydore

Figure 19

C 20.1



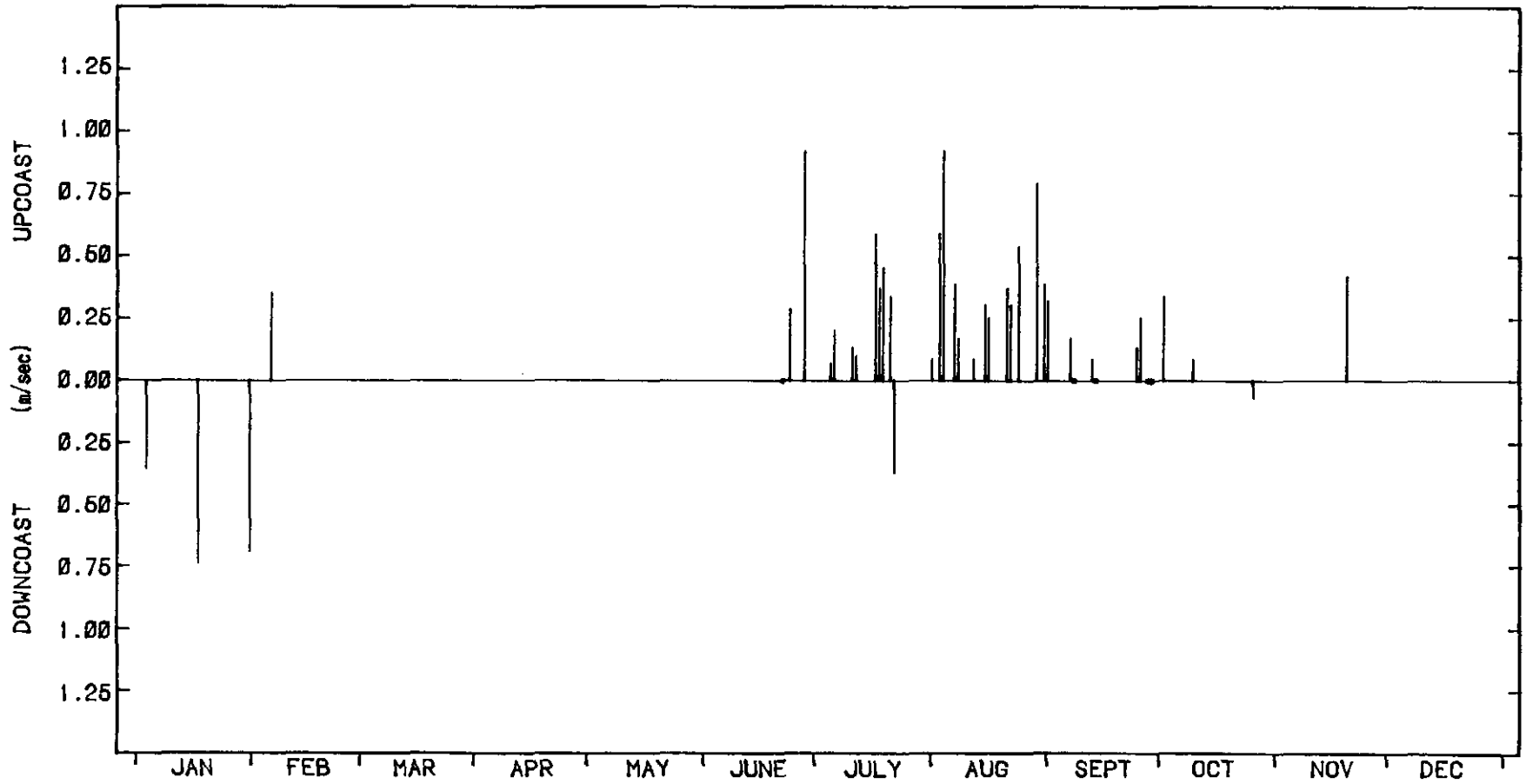
LITTORAL CURRENTS - AFTERNOON 1978

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORE

0701



LITTORAL CURRENT SUMMARY - 1978

Mean Vel = 0.202 m/sec (up)

Mean Upcoast Vel = 0.334 m/sec

Mean Downcoast Vel = 0.440 m/sec

AFTERNOON OBSERVATIONS - (42 recordings)

COPE
Maroochydore

Figure 20

C 20.1



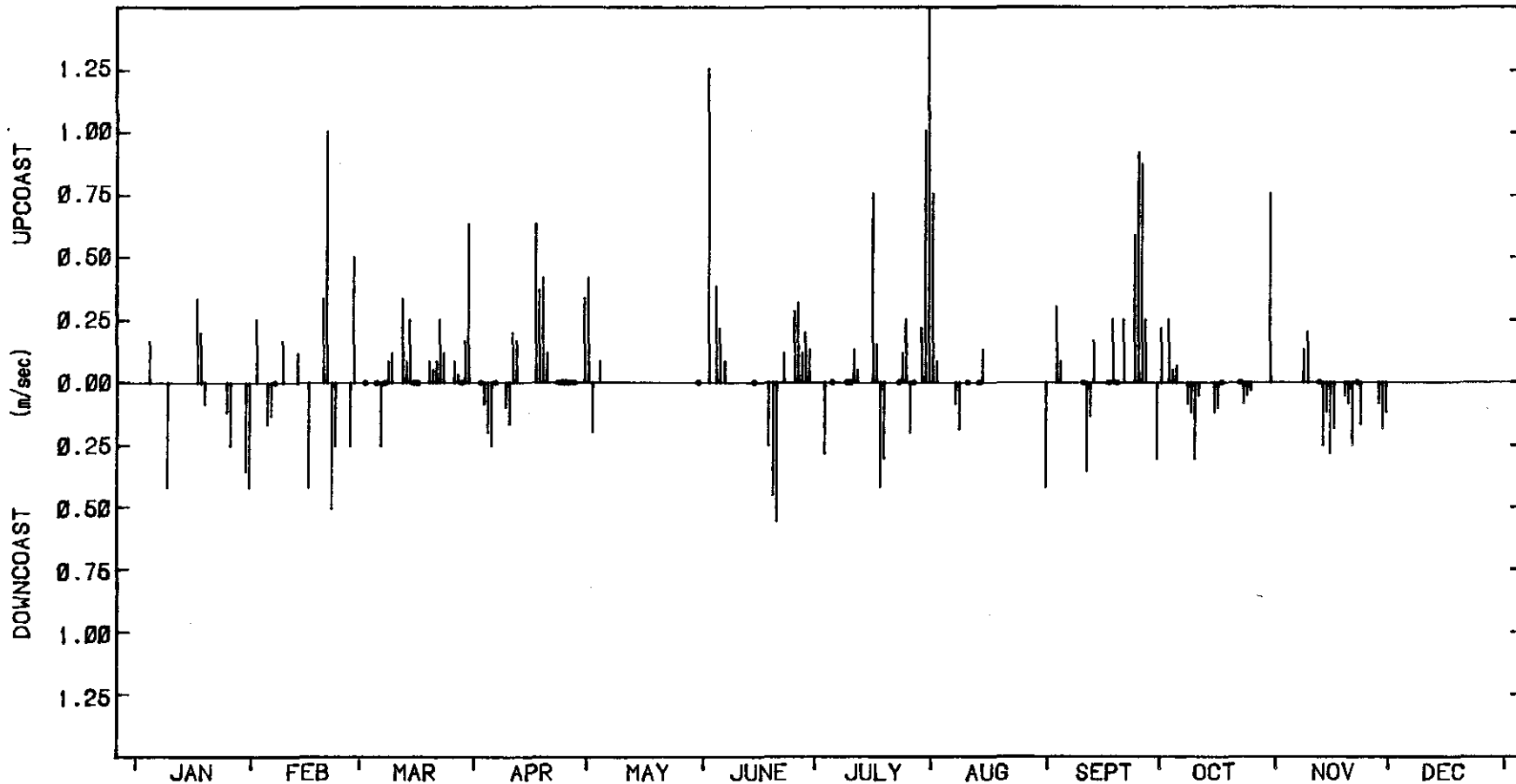
LITTORAL CURRENTS - MORNING 1979

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORE

0701



LITTORAL CURRENT SUMMARY - 1979

Mean Vel = 0.073 m/sec (up)

Mean Upcoast Vel = 0.319 m/sec

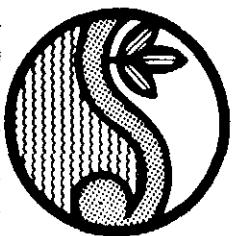
Mean Downcoast Vel = 0.216 m/sec

MORNING OBSERVATIONS - (152 recordings)

COPE
Maroochydore

Figure 21

C 20.1



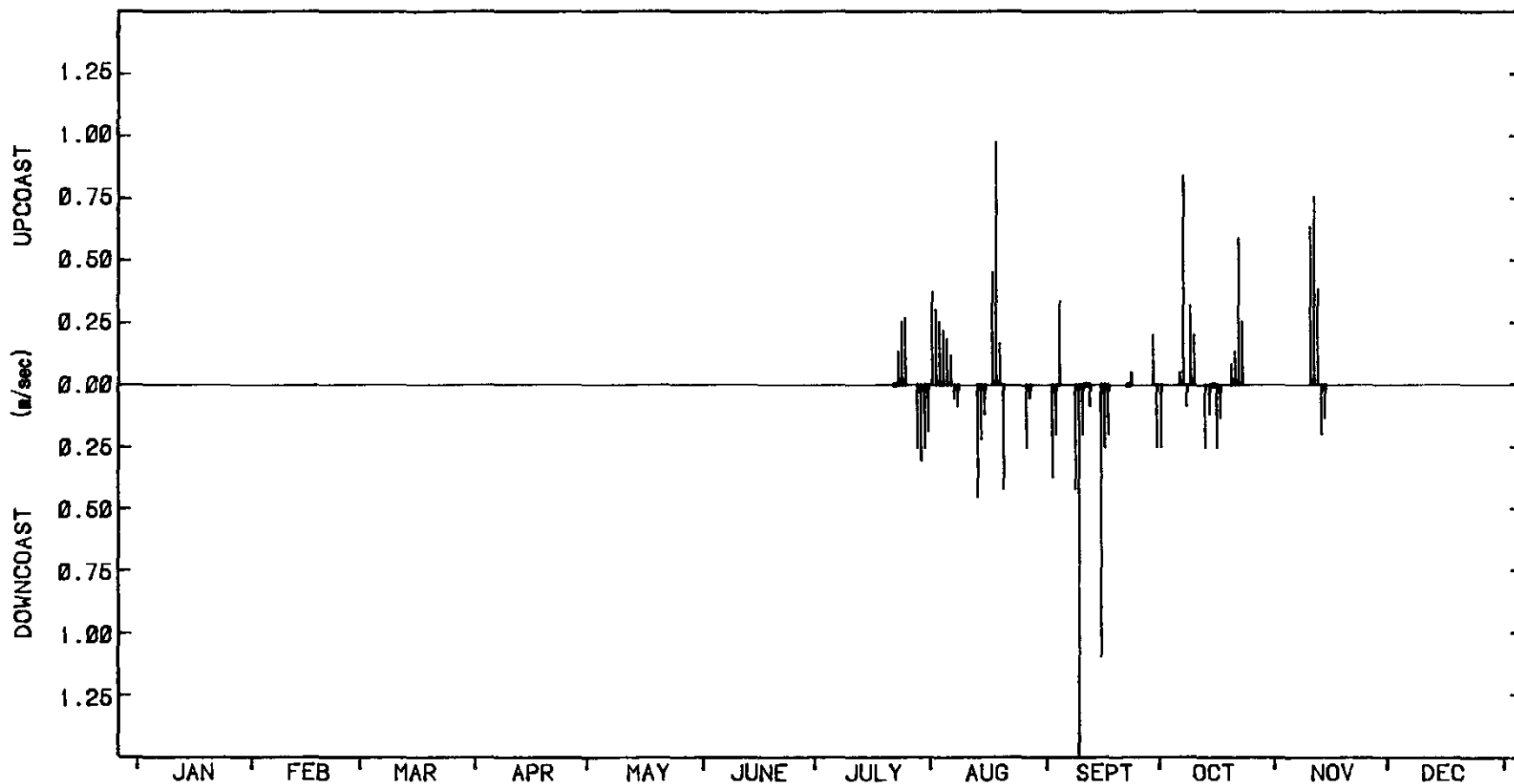
LITTORAL CURRENTS - MORNING 1980

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORE

0701



LITTORAL CURRENT SUMMARY - 1980

Mean Vel = -.005 m/sec (down)

Mean Upcoast Vel = 0.326 m/sec

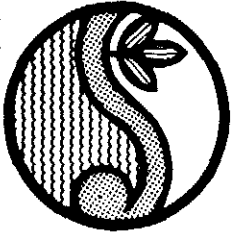
Mean Downcoast Vel = 0.292 m/sec

MORNING OBSERVATIONS - (60 recordings)

COPE
Maroochydore

Figure 22

C 20.1



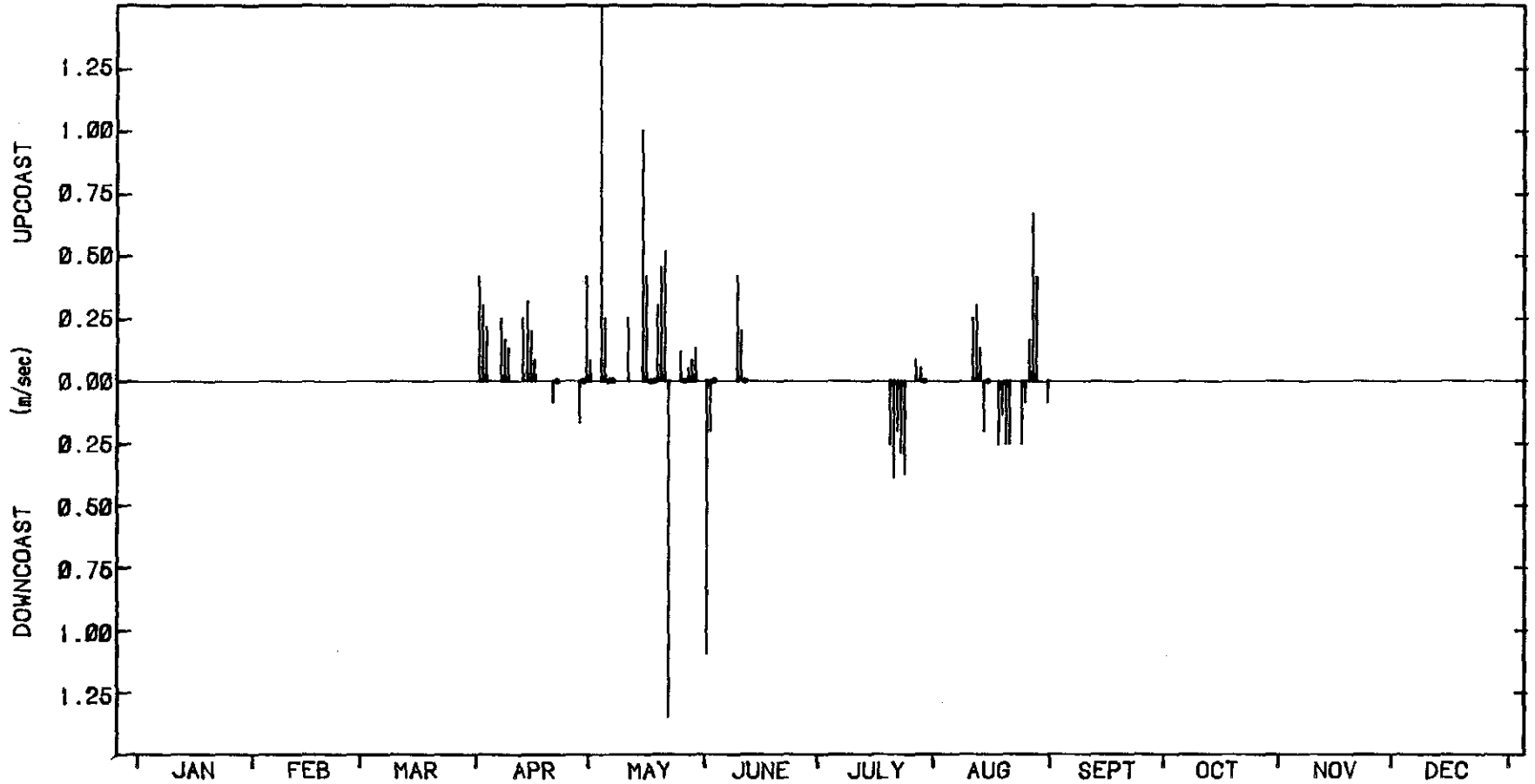
LITTORAL CURRENTS - MORNING 1981

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

MAROOCHYDORÉ

0701



LITTORAL CURRENT SUMMARY - 1981

Mean Vel = 0.078 m/sec (up)

Mean Upcoast Vel = 0.316 m/sec

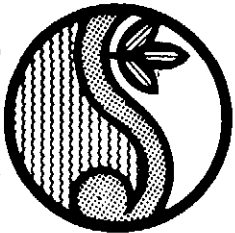
Mean Downcoast Vel = 0.325 m/sec

MORNING OBSERVATIONS - (63 recordings)

COPE
Maroochydore

Figure 23

C 20.1



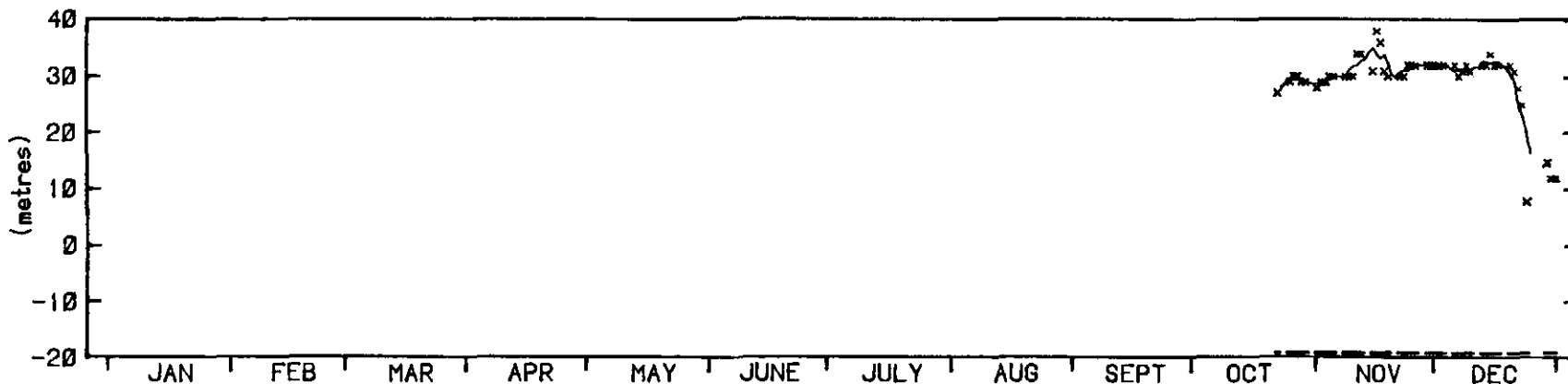
BEACH PROFILE PARAMETERS - 1976

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

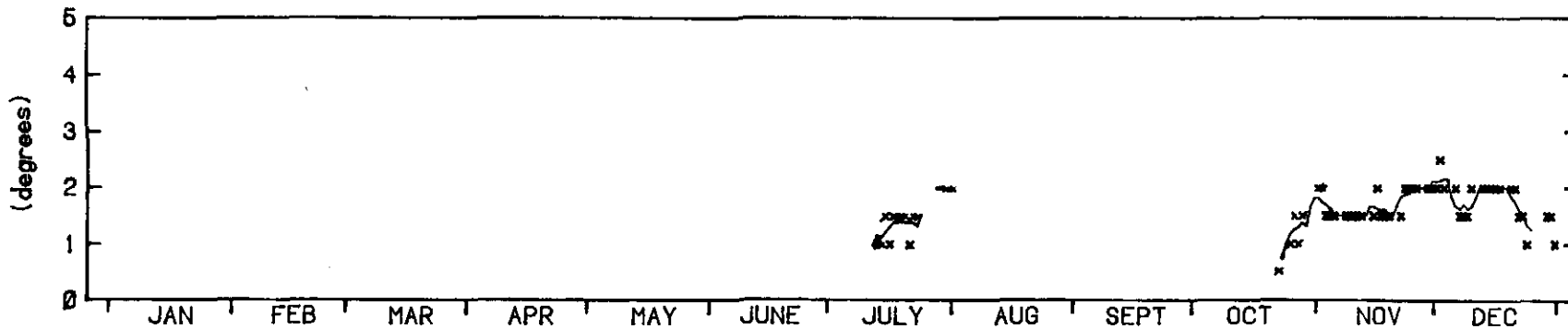
MAROOCHYDORE

0701



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1976

--- Indicates Distance to Fixed Contour : 49 Observations Fixed Contour Level is approx 1.5 m above AHD
 — Indicates Distance to Vegetation Line : 49 Observations



FORESHORE SLOPE - 1976

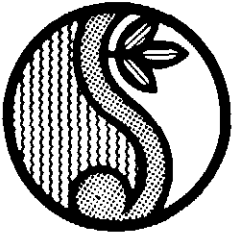
— Five Day Moving Average

No. of Observations : 63

COPE
 Maroochydore

Figure 24

C 20.1



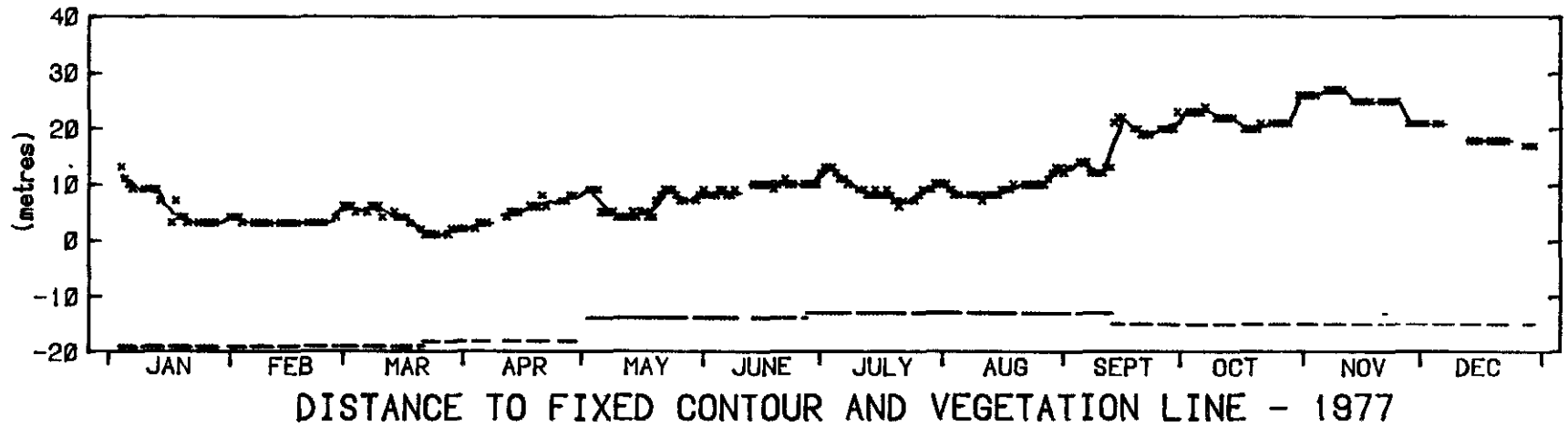
BEACH PROFILE PARAMETERS - 1977

COPE - Coastal Observation Programme Engineering

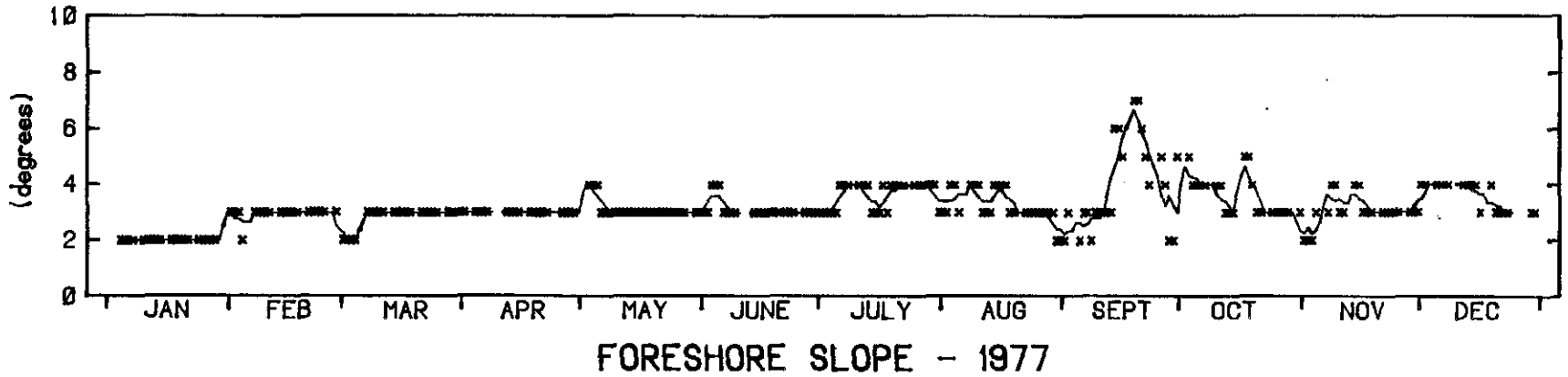
MAROOCHY SHIRE

MAROOCHYDORE

0701



x x x x Indicates Distance to Fixed Contour : 266 Observations Fixed Contour Level is approx 1.5 m above AHD
 - - - Indicates Distance to Vegetation Line : 271 Observations

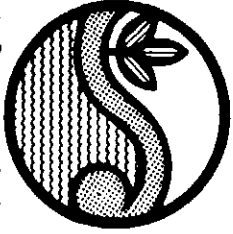


Five Day Moving Average

No. of Observations : 268

Figure 25
C 20.1

COPE
Maroochydore



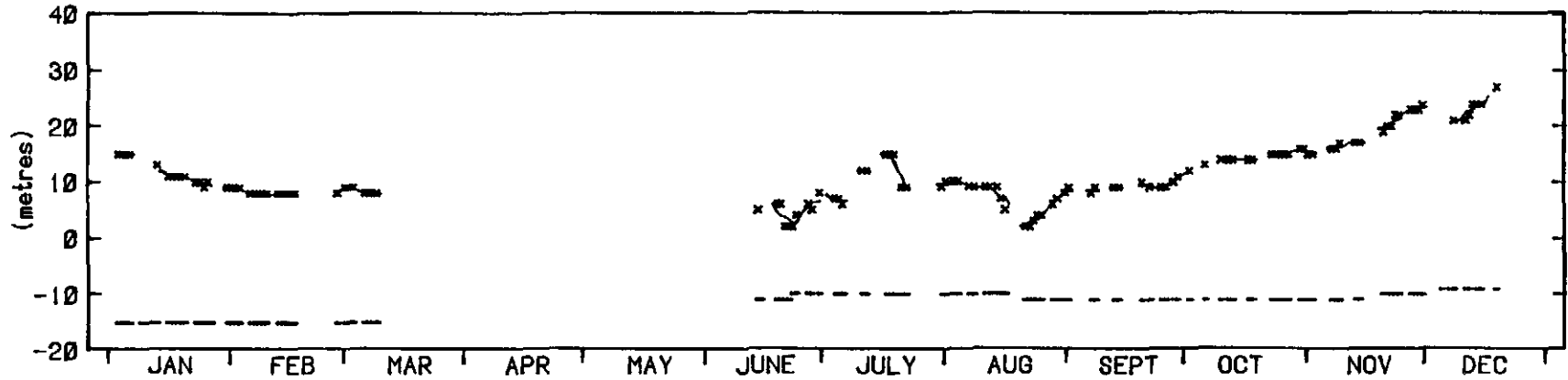
BEACH PROFILE PARAMETERS - 1978

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

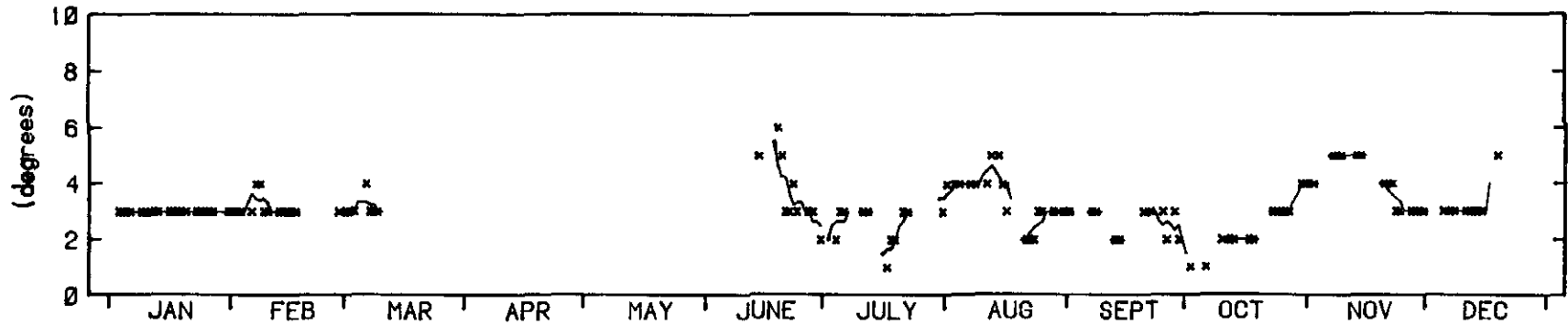
MAROOCHYDORE

0701



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1978

Indicates Distance to Fixed Contour : 123 Observations Fixed Contour Level is approx 1.5 m above AHD
 Indicates Distance to Vegetation Line : 130 Observations



FORESHORE SLOPE - 1978

Five Day Moving Average

No. of Observations : 130

COPE

Maroochydore

Figure 26

C 20.1



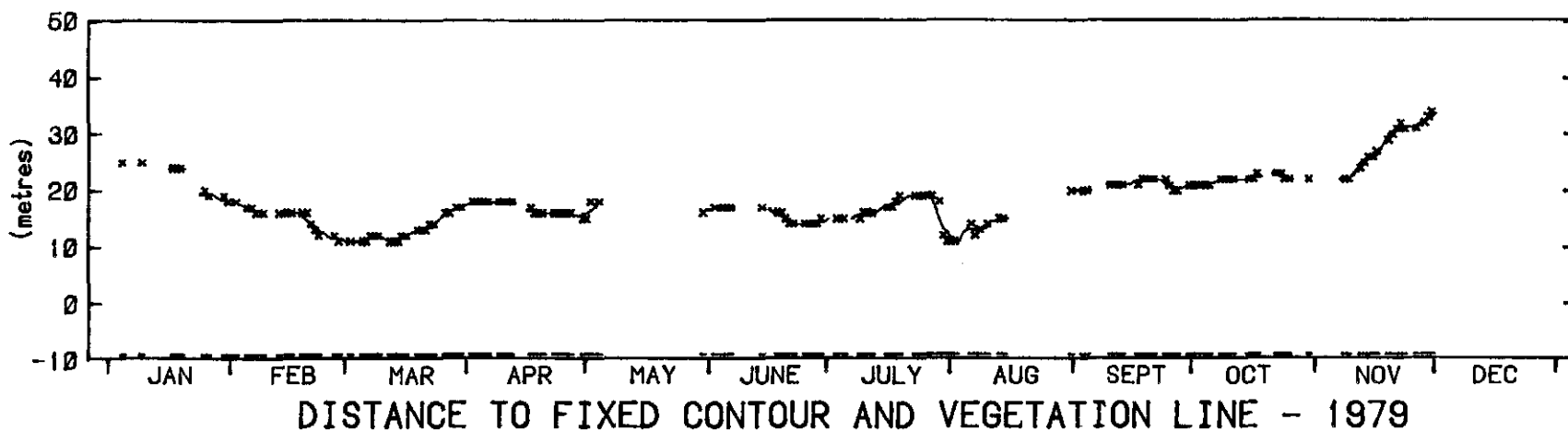
BEACH PROFILE PARAMETERS - 1979

COPE - Coastal Observation Programme Engineering

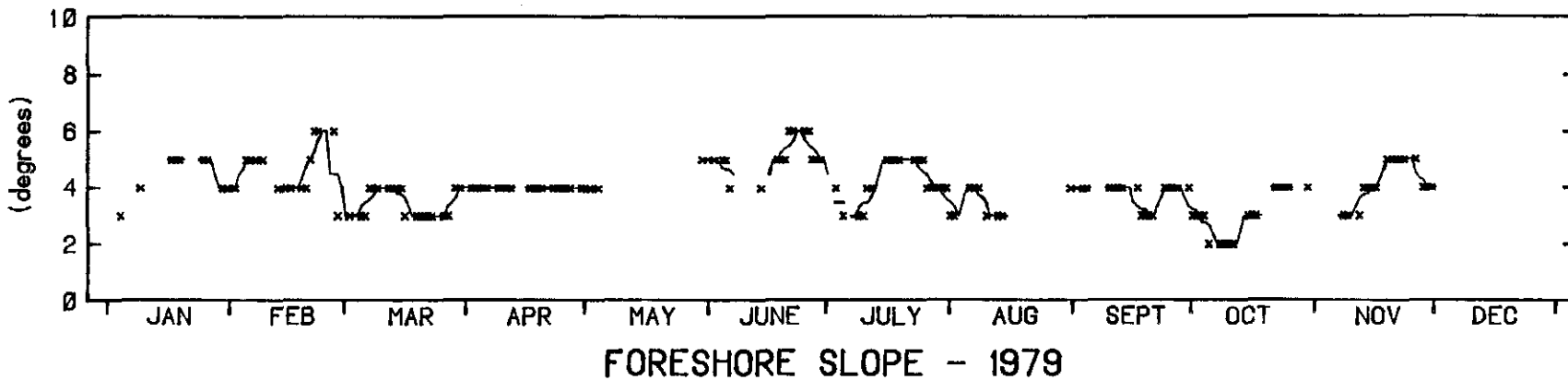
MAROOCHY SHIRE

MAROOCHYDORE

0701



Indicates Distance to Fixed Contour : 158 Observations Fixed Contour Level is approx 1.5 m above AHD
 Indicates Distance to Vegetation Line : 159 Observations



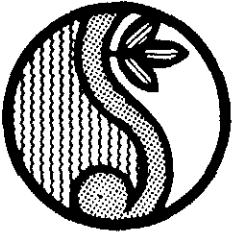
Five Day Moving Average

No. of Observations : 158

Figure 27

C 20.1

COPE
Maroochydore



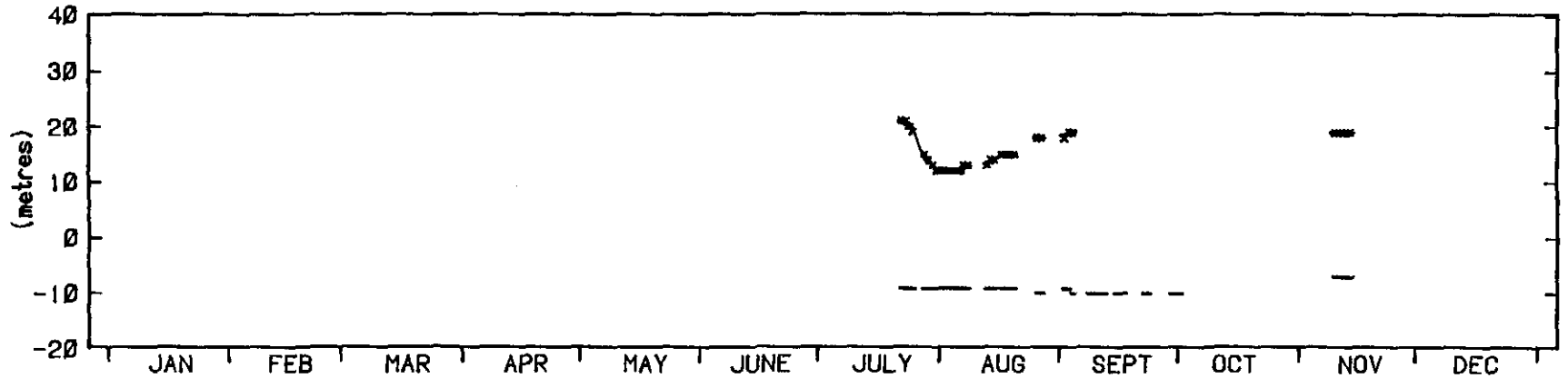
BEACH PROFILE PARAMETERS - 1980

COPE - Coastal Observation Programme Engineering

MAROOCHY SHIRE

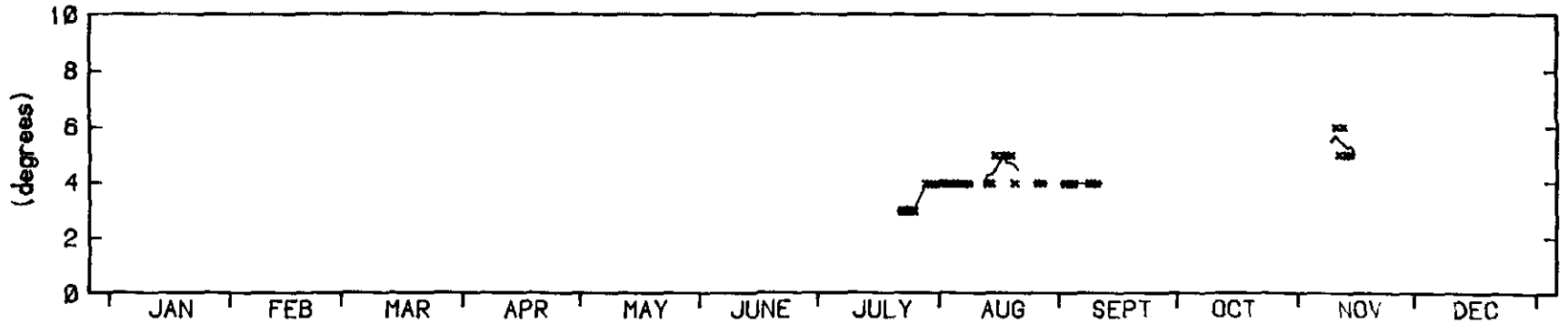
MAROOCHYDORE

0701



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1980

----- Indicates Distance to Fixed Contour : 33 Observations Fixed Contour Level is approx 1.5 m above AHD
 ———— Indicates Distance to Vegetation Line : 46 Observations



FORESHORE SLOPE - 1980

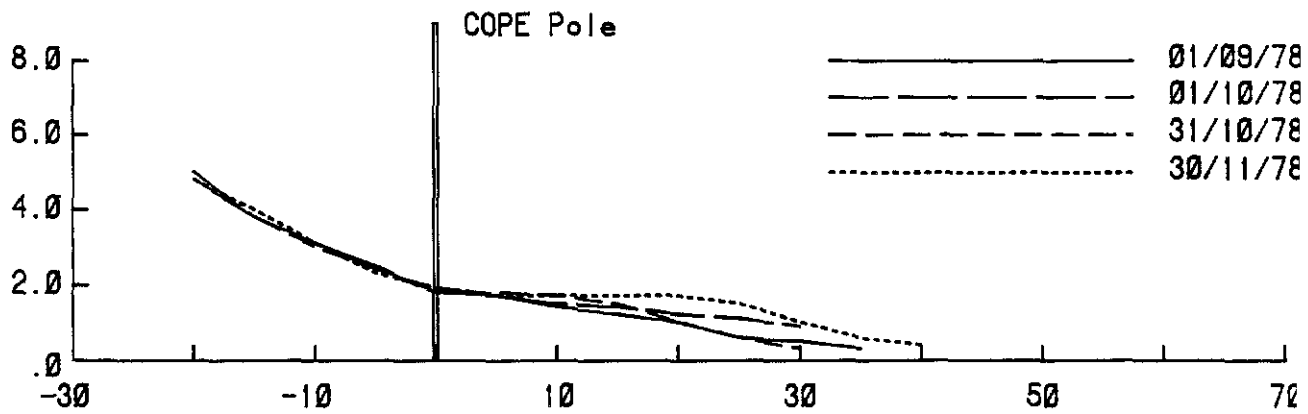
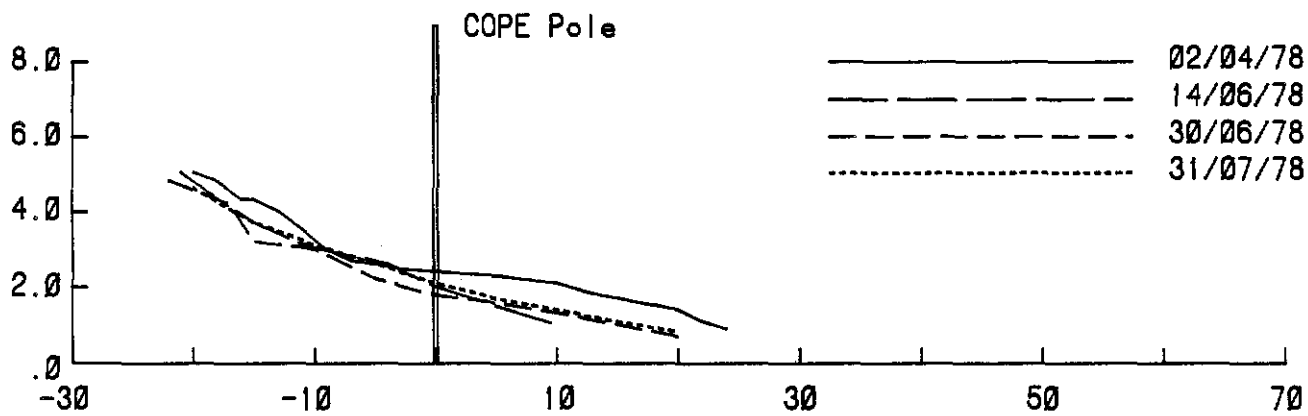
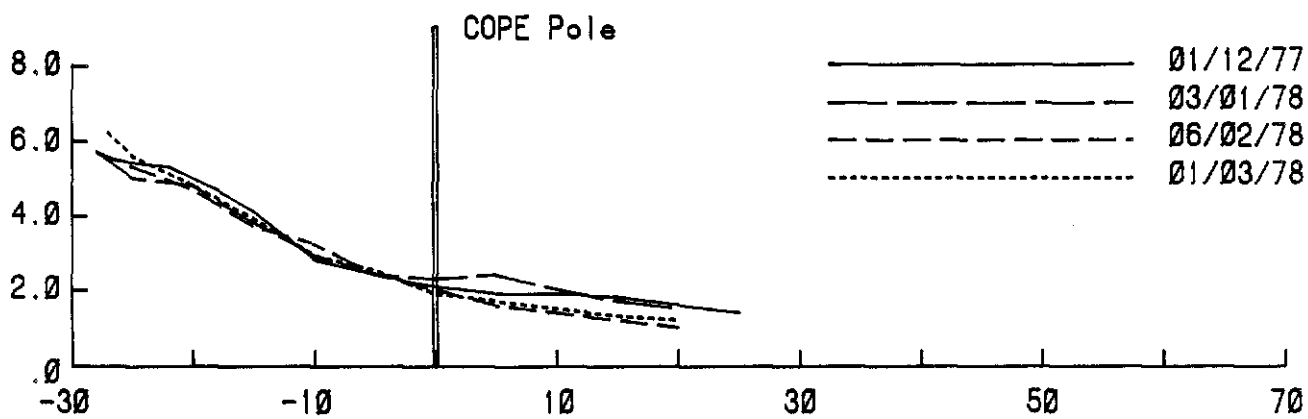
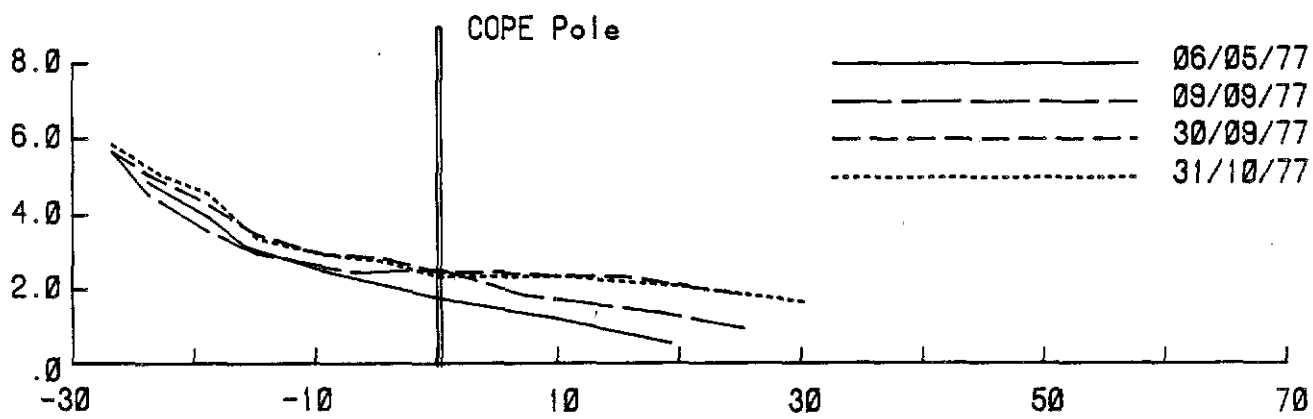
— — — — — Five Day Moving Average

No. of Observations : 36

COPE
Maroochydore

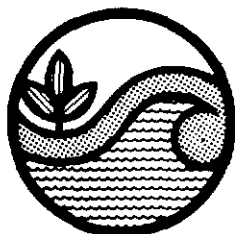
Figure 28

C 20.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



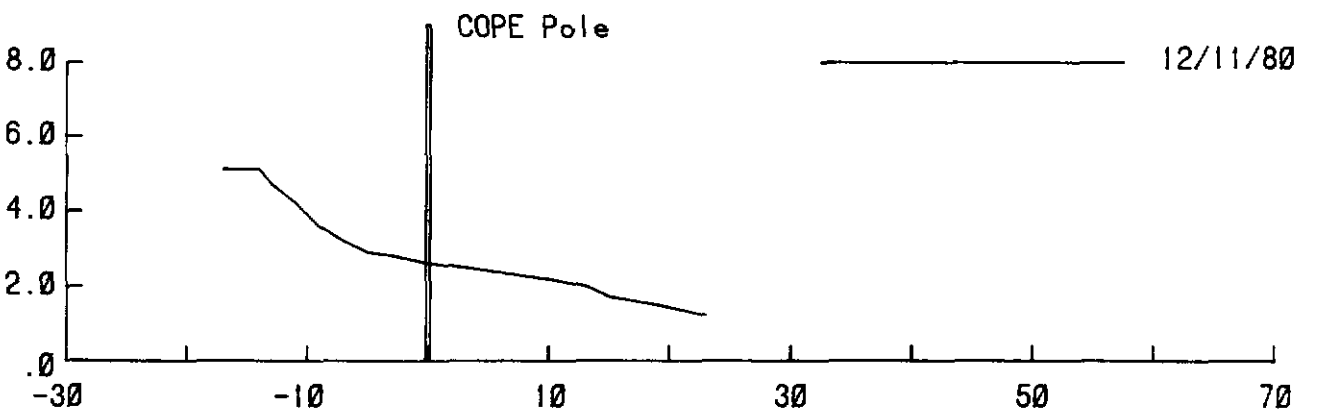
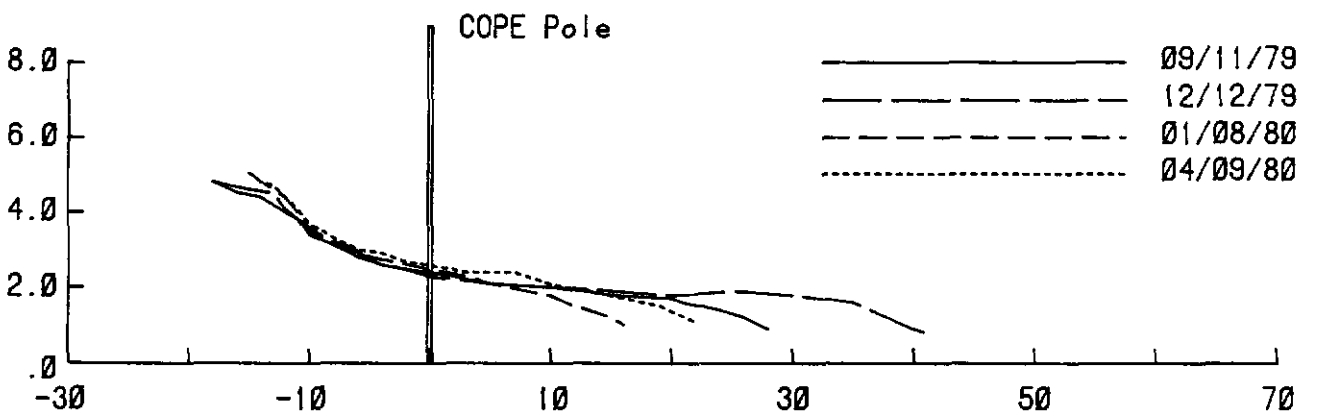
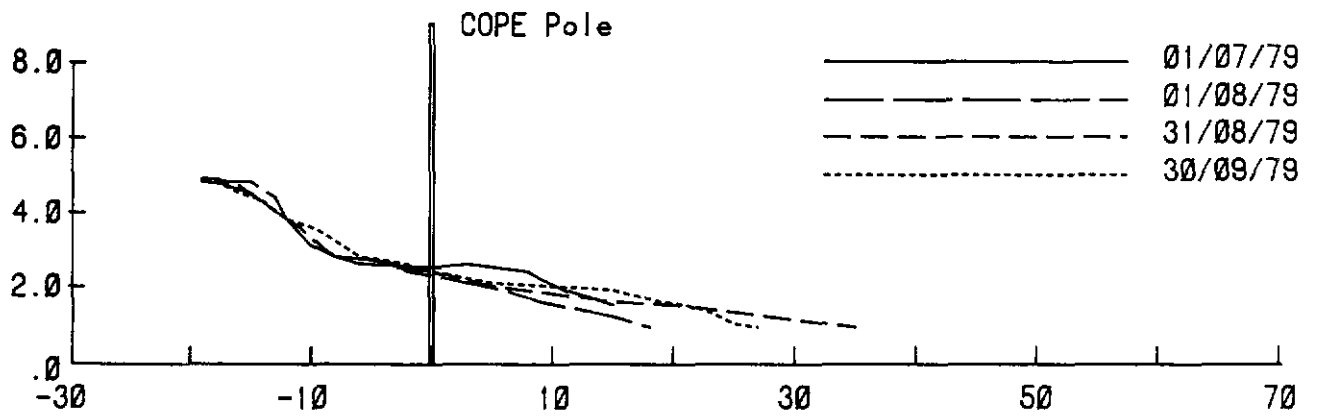
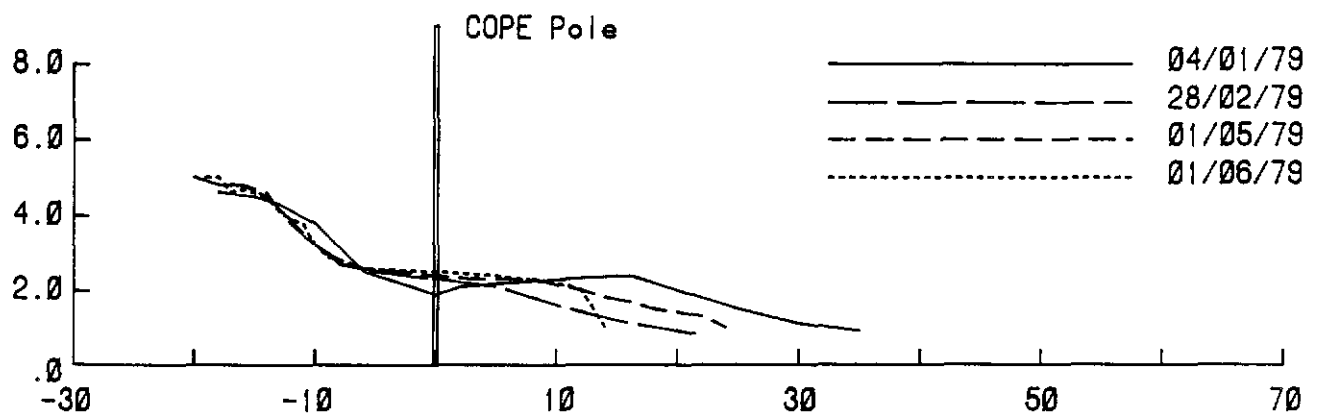
Beach Protection Authority

MONTHLY BEACH PROFILES

COPE
Maroochydore

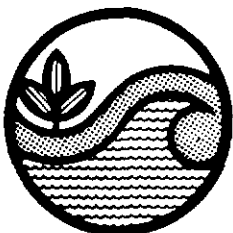
Figure 29

C 20.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



Beach Protection Authority

MONTHLY BEACH PROFILES

COPE
Maroochydore

Figure 30

C 20.1