

COASTAL OBSERVATION PROGRAMME - ENGINEERING (COPE)

NOOSA BEACH - NOOSA SHIRE

For the Years 1977 to 1980

Beach Protection Authority

November 1984

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ABSTRACT:

This report provides a summary of primary analyses of COPE data on wind, wave and beach processes observed at Noosa Beach in Noosa Shire in southern Queensland. The data were recorded by volunteer observers Mr. Barry Admans, Mr. Val Smart, Mr. Noel Westaway, Mr. Alf Weimann and Mr. Gerry Helton, during the period November 1977 to December 1980. The recordings were made daily during the three year period and the information published is considered representative and reliable.

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Coastal Observation Programme - Engineering (COPE), Mission Beach - Johnstone Shire. (Report C 11.1).

Coastal Observation Programme - Engineering (COPE), Urangan - Town of Hervey Bay, (Report C 12.1).

REFERENCES:

1. ROBINSON D.A. and JONES C.M.

Queensland Volunteer Coastal Observation Program - Engineering (COPE). 3rd Australian Conference on Coastal and Ocean Engineering, Melbourne, April 1979.

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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

Each COPE observer is supplied with a basic kit of recording instruments including:-

- 30 metre Tape
- Wind Meter
- Abney Level
- 1.5 metre Sighting Support
- 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 manned 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 three year period 1977 to 1980 in a useful statistical form. No attempt has been made to interpret the observed data.

If this three year period is representative of the long term average meteorological conditions, the wind, wave and beach movement climatologies presented can be regarded as typical. However, this recording period is 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

The Noosa Beach COPE Station is adjacent to the town of Noosa which is located approximately 120 kilometres north of Brisbane. Noosa Beach forms part of the coastline of Laguna Bay, between the Noosa River mouth in the north and the rocky headland of Noosa Head in the south. The location of the Noosa Beach COPE Station is shown in Figure 1.

2.2 Observers

This station has been manned by Mr. Barry Admans, Mr. Val Smart, Mr. Noel Westaway, Mr. Alf Weimann and Mr. Gerry Helton during the period November 1977 to December 1980. All observers are or have been local residents.

2.3 Observed Parameters

The observers at this station recorded at either 9.30 a.m. or 4.00 p.m. daily from November 1977 to December 1980.

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 Berm
- Berm Elevation
- Distance to Vegetation
- Foreshore Slope
- Longshore Current Speed
- Longshore Current Direction

In addition, a sand sample was collected at the station each month from February 1978 and since October 1978 a beach profile has usually been recorded monthly also.

2.4 Tidal Information

Tidal information for this station is presented below. Datum is Low Water Datum.

M.H.W.S. : 1.7 metres
 M.H.W.N. : 1.4 metres
 M.S.L. : 0.94 metres
 M.L.W.S. : 0.2 metres
 M.L.W.N. : 0.5 metres.

2.5 Description of the Beach

The beach at the Noosa beach COPE station has had extensive development along the foredune thus necessitating in the construction of a boulder wall. It exhibits the following characteristics:—

- Typical beach slopes: foreshore slope is in the range 1 in 10 to 1 in 15 (4° - 6°)
- Beach width: typically 10 to 25 metres from the vegetation line.
- D50 sand size: 0.30 mm averaged over three years.
- Adjoining Landform: well developed frontal dune.
- Vegetation: Beach spinifex (*Spinifex hirsutus*) open-grassland on the seaward slope and crest of the frontal dune. Horsetail she-oak (*Casuarina equisetifolia* var. *incana*) low open-forest on the crest and landward slope of the frontal dune.

2.6 Supervision of Station

The observers were instructed in the recording program 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 the Noosa 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 three year period November 1977 to December 1980 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 observer 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 observer estimates 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 ^o	to	60 ^o
Sector 2	-	60 ^o	to	85 ^o
Sector 3	-	85 ^o	to	95 ^o
Sector 4	-	95 ^o	to	120 ^o
Sector 5	-	120 ^o	to	180 ^o

Note: 0^o is the beach alignment to the left of the observer when facing seaward.

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 in Figures 6 to 12.
- (d) tabulation of the occurrence of various wave heights, periods, types and directions (Tables 1 to 4).

3.4 Longshore Currents

The observer 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 13 to Figure 19). 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:

- elevation of berm crest and distance from the reference pole to the seaward edge of the berm. (from 12/10/78 to 26/9/80).
- distance from reference pole to the vegetation line (usually front face of fore-dune).
- 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 20 to 27.

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 28 and 29.

TABLE 1

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

NOOSA BEACH

YEAR 1977

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - 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														
AUGUST														
SEPTEMBER														
OCTOBER														
NOVEMBER	10.9	0.73	100.0	-	-	-	-	-	-	-	100.0	-	-	
DECEMBER	8.9	0.40	96.3	3.7	-	-	-	-	-	17.9	82.1	-	-	
WHOLE YEAR	9.1	0.44	96.7	3.3	0.0	0.0	0.0	0.0	0.0	16.1	83.9	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

NOOSA BEACH

YEAR 1978

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - Wave Type /Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	10.2	0.50	58.1	6.5	3.2	29.0	3.2	-	-	25.8	71.0	-	3.2
FEBRUARY	6.7	0.34	89.3	7.1	-	3.6	-	-	-	92.9	7.1	-	-
MARCH	7.2	0.55	80.0	-	-	20.0	-	-	-	100.0	-	-	-
APRIL	8.7	0.61	53.3	33.3	6.7	-	6.7	-	-	46.7	46.6	-	6.7
MAY	8.4	0.54	48.4	12.9	-	35.5	3.2	-	-	87.2	9.6	-	3.2
JUNE	13.4	0.53	6.7	60.0	-	33.3	-	-	-	100.0	-	-	-
JULY	9.7	0.55	35.7	25.0	-	35.7	3.6	-	-	96.4	-	-	3.6
AUGUST	10.9	0.35	71.0	12.9	-	16.1	-	-	-	51.6	48.4	-	-
SEPTEMBER	11.6	0.32	24.1	24.1	-	44.8	6.9	-	-	65.5	27.6	-	6.9
OCTOBER	9.7	0.47	33.3	20.0	-	46.7	-	-	-	96.7	3.3	-	-
NOVEMBER	7.8	0.54	34.6	-	-	65.4	-	-	-	96.1	3.9	-	-
DECEMBER	8.6	0.46	67.9	17.9	-	14.3	-	-	-	100.0	-	-	-
WHOLE YEAR	9.4	0.48	50.3	18.4	0.9	28.4	2.0	0.0	0.0	79.2	18.8	0.0	2.0

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**

NOOSA BEACH

YEAR 1979

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - Wave Type /Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	8.5	1.01	19.4	9.7	-	71.0	-	-	-	96.8	3.2	-	-
FEBRUARY	8.2	0.62	3.8	-	-	96.2	-	-	-	100.0	-	-	-
MARCH	8.3	0.37	61.5	3.8	-	34.6	-	-	-	100.0	-	-	-
APRIL	8.6	0.46	25.0	-	-	75.0	-	-	-	100.0	-	-	-
MAY	9.3	0.35	-	24.1	-	75.9	-	-	-	100.0	-	-	-
JUNE	8.7	0.41	3.7	18.5	-	77.8	-	-	-	100.0	-	-	-
JULY	8.1	0.38	16.7	23.3	-	60.0	-	-	-	100.0	-	-	-
AUGUST	8.9	0.30	41.4	10.3	-	41.4	6.9	-	-	93.1	-	-	6.9
SEPTEMBER	7.2	0.41	52.2	8.7	-	39.1	-	-	4.3	95.7	-	-	-
OCTOBER	6.2	0.34	51.9	11.1	-	37.0	-	-	-	100.0	-	-	-
NOVEMBER	6.1	0.35	34.5	10.3	-	55.2	-	-	-	100.0	-	-	-
DECEMBER	5.8	0.35	22.7	9.1	-	68.2	-	-	-	100.0	-	-	-
WHOLE YEAR	7.4	0.45	27.2	11.0	0.0	61.2	0.6	0.0	0.3	98.8	0.3	0.0	0.6

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

NOOSA BEACH

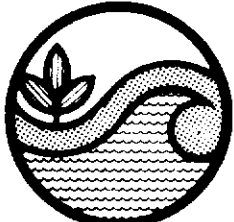
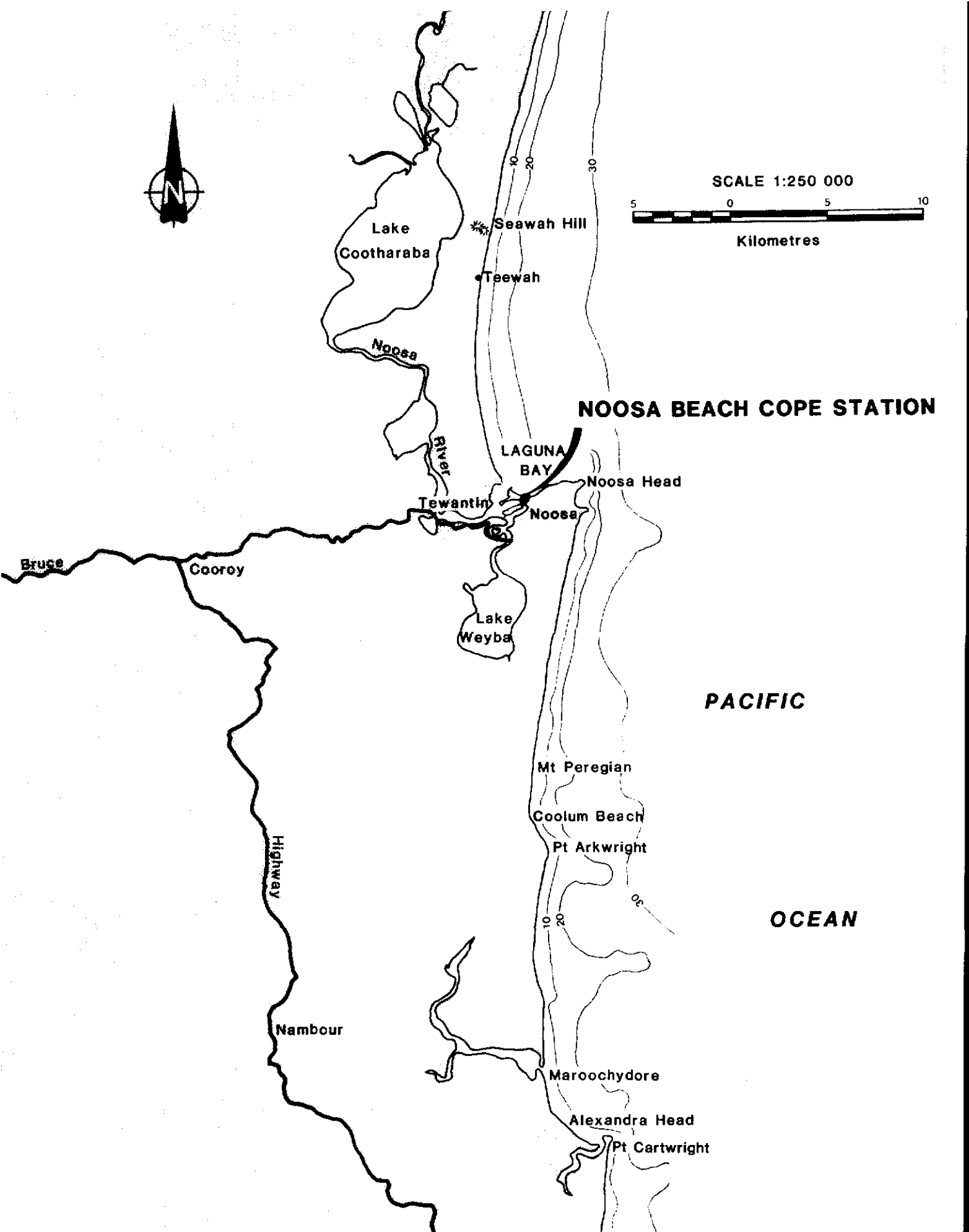
YEAR 1980

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - Wave Type /Wave Direction											
			Wave Type					Wave Direction						
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm	
JANUARY	5.8	0.41	3.6	-	-	96.4	-	-	-	-	100.0	-	-	-
FEBRUARY	9.3	0.59	24.1	6.9	-	69.0	-	-	-	-	100.0	-	-	-
MARCH	10.6	0.31	61.9	-	-	38.1	-	-	-	-	100.0	-	-	-
APRIL	8.2	0.47	4.2	62.5	-	33.3	-	-	-	-	100.0	-	-	-
MAY	8.4	0.55	19.2	30.8	-	50.0	-	-	-	-	100.0	-	-	-
JUNE	7.8	0.34	40.0	6.7	-	53.3	-	-	-	-	100.0	-	-	-
JULY	6.8	0.17	28.6	14.3	-	57.1	-	-	-	-	100.0	-	-	-
AUGUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEPTEMBER	10.0	0.38	26.3	47.4	-	-	26.3	-	-	-	73.7	-	-	26.3
OCTOBER	11.6	0.38	22.2	51.9	-	22.2	3.7	-	-	-	96.3	-	-	3.7
NOVEMBER	9.2	0.37	51.7	27.6	-	20.7	-	-	-	-	96.4	3.6	-	-
DECEMBER	11.2	0.64	50.0	50.0	-	-	-	-	-	-	100.0	-	-	-
WHOLE YEAR	9.0	0.43	27.9	26.6	0.0	42.9	2.6	0.0	0.0	0.0	96.9	0.5	0.0	2.6

SP - Spilling

PL - Plunging

SP/PL - Combined spilling and plunging

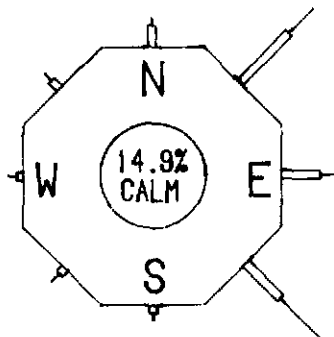


Beach Protection Authority

LOCALITY PLAN

COPE
 Noosa Beach
Figure 1
 C 13.1

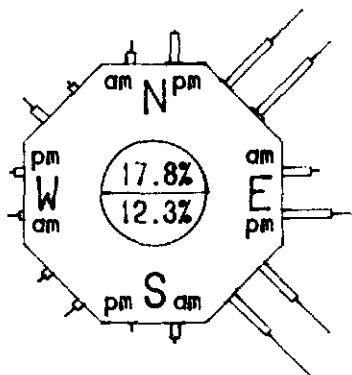
ALL OBSERVATIONS



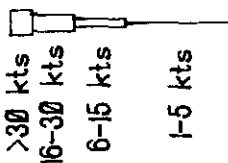
Total No. of Observations : 939

MORNING - AFTERNOON OBSERVATIONS

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

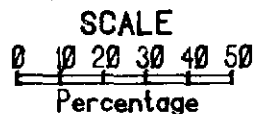


LEGEND

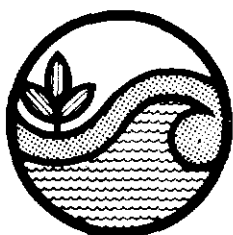


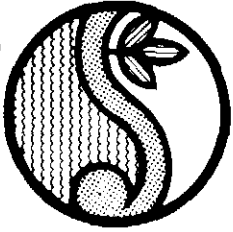
No. of Morning Observations : 450
 No. of Afternoon Observations : 489

Mean Time :- Morning Obs : 0925 hrs
 Mean Time :- Afternoon Obs : 1556 hrs



WIND DATA - NOV 1977 to DEC 1980





WAVE HEIGHT % EXCEEDANCE

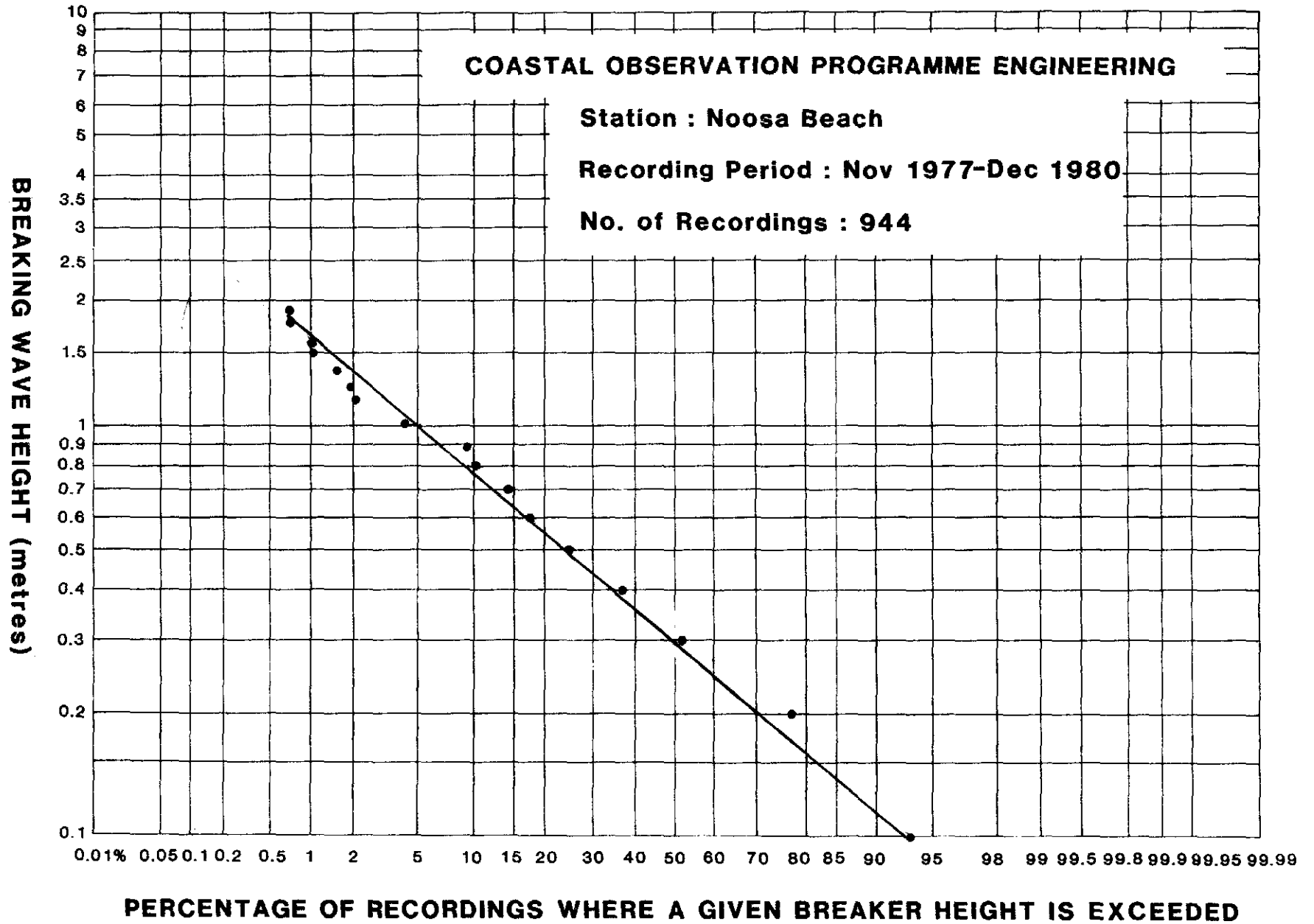
ALL DATA

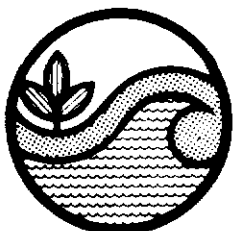
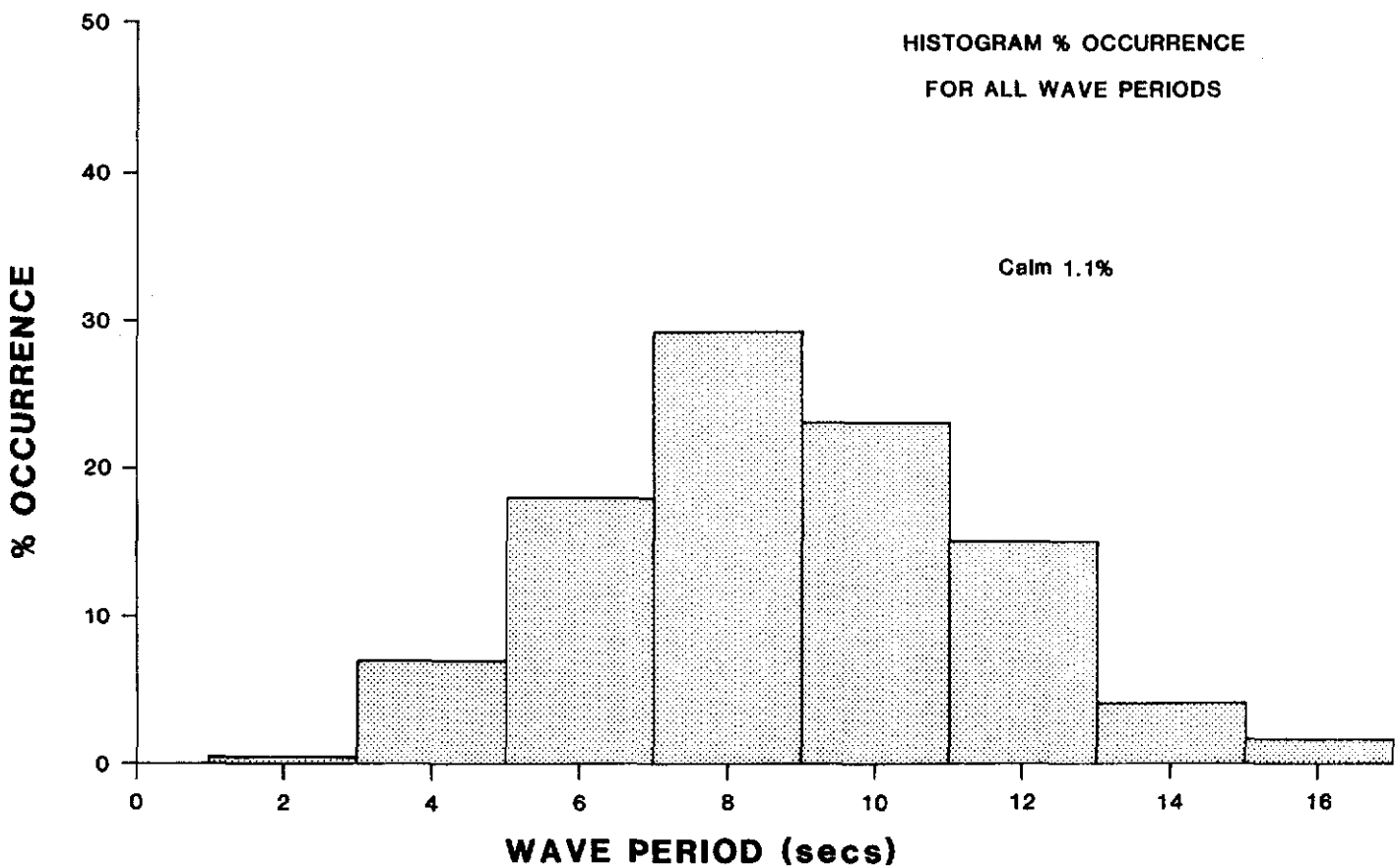
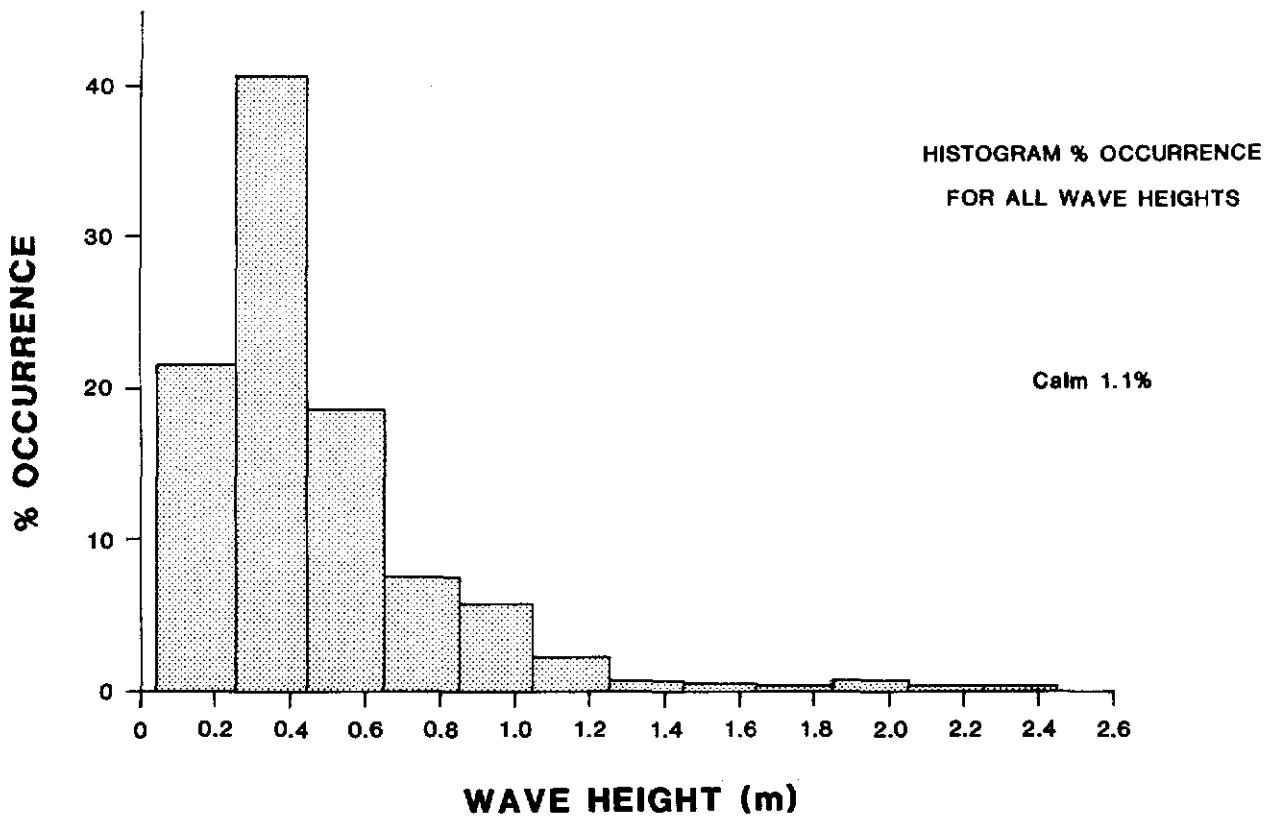
COPE

Noosa Beach

Figure 3

C 13.1





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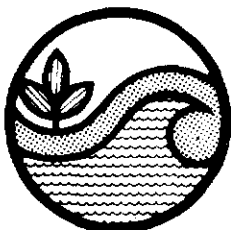
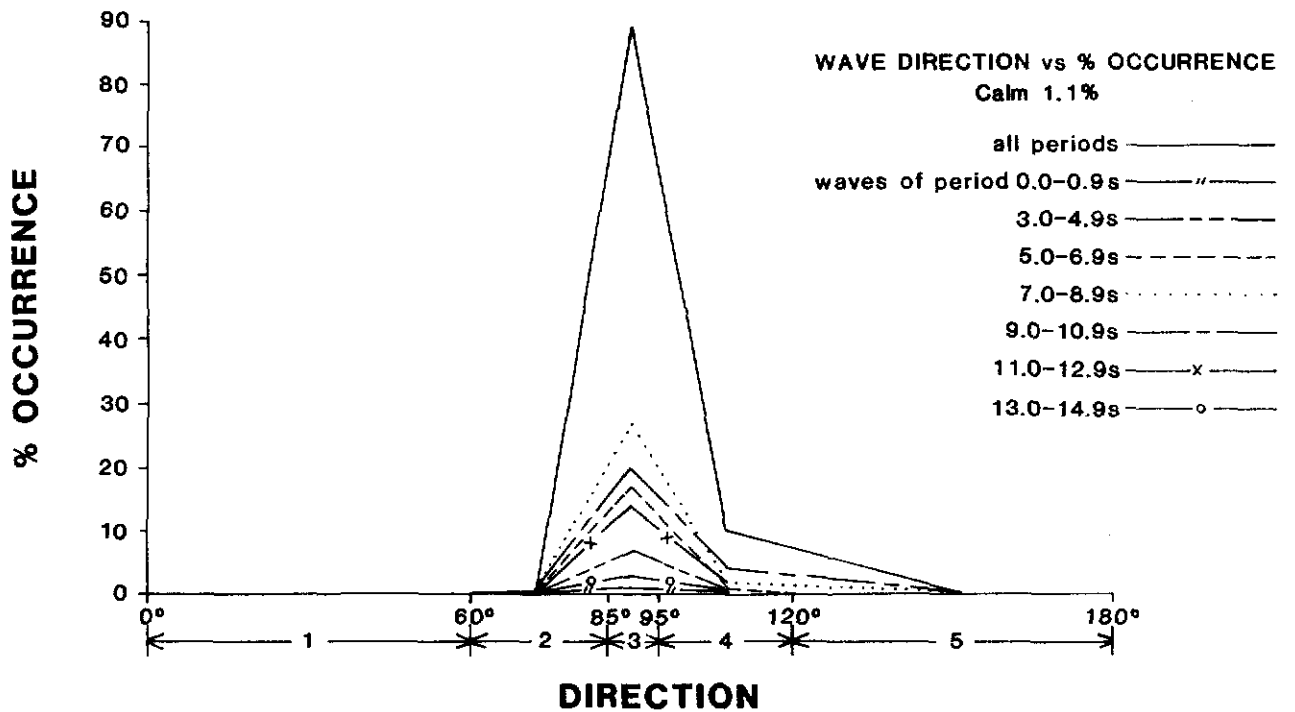
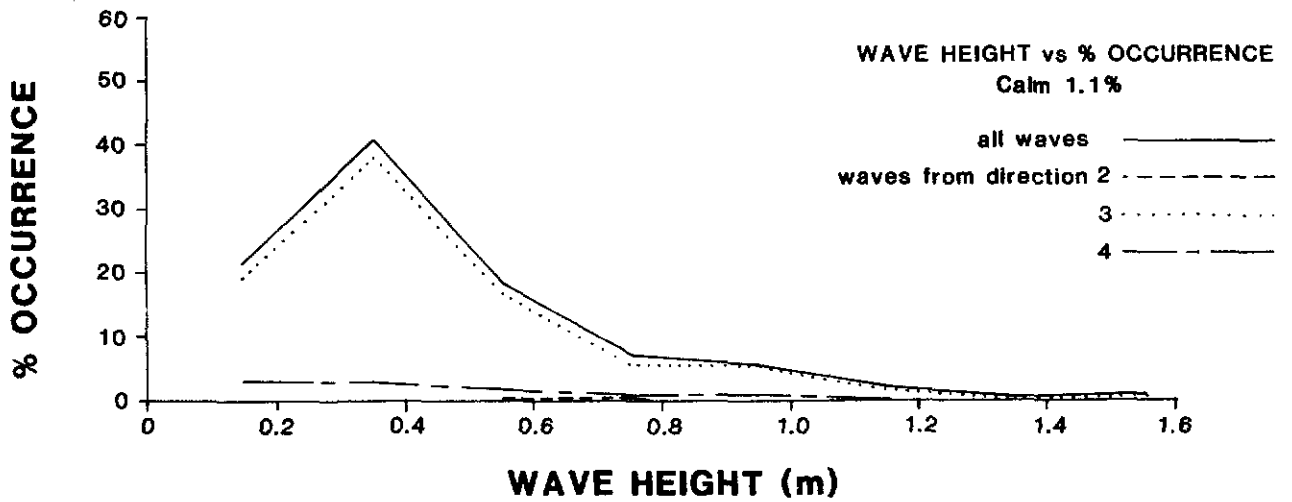
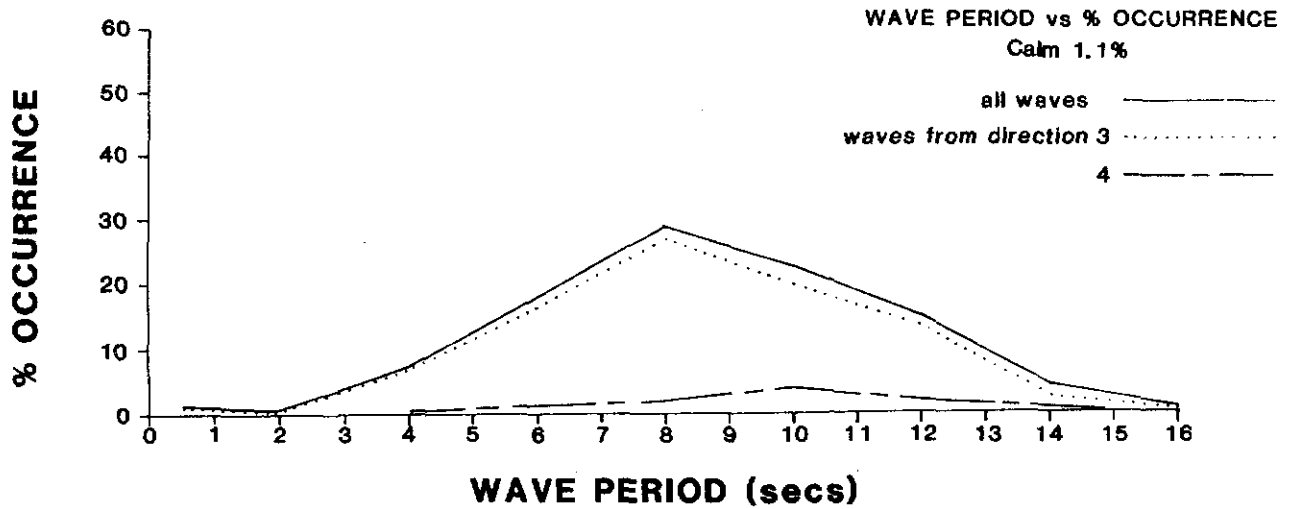
**WAVE HEIGHT AND PERIOD % OCCURRENCE
ALL DATA**

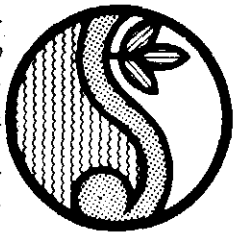
COPE

Noosa Beach

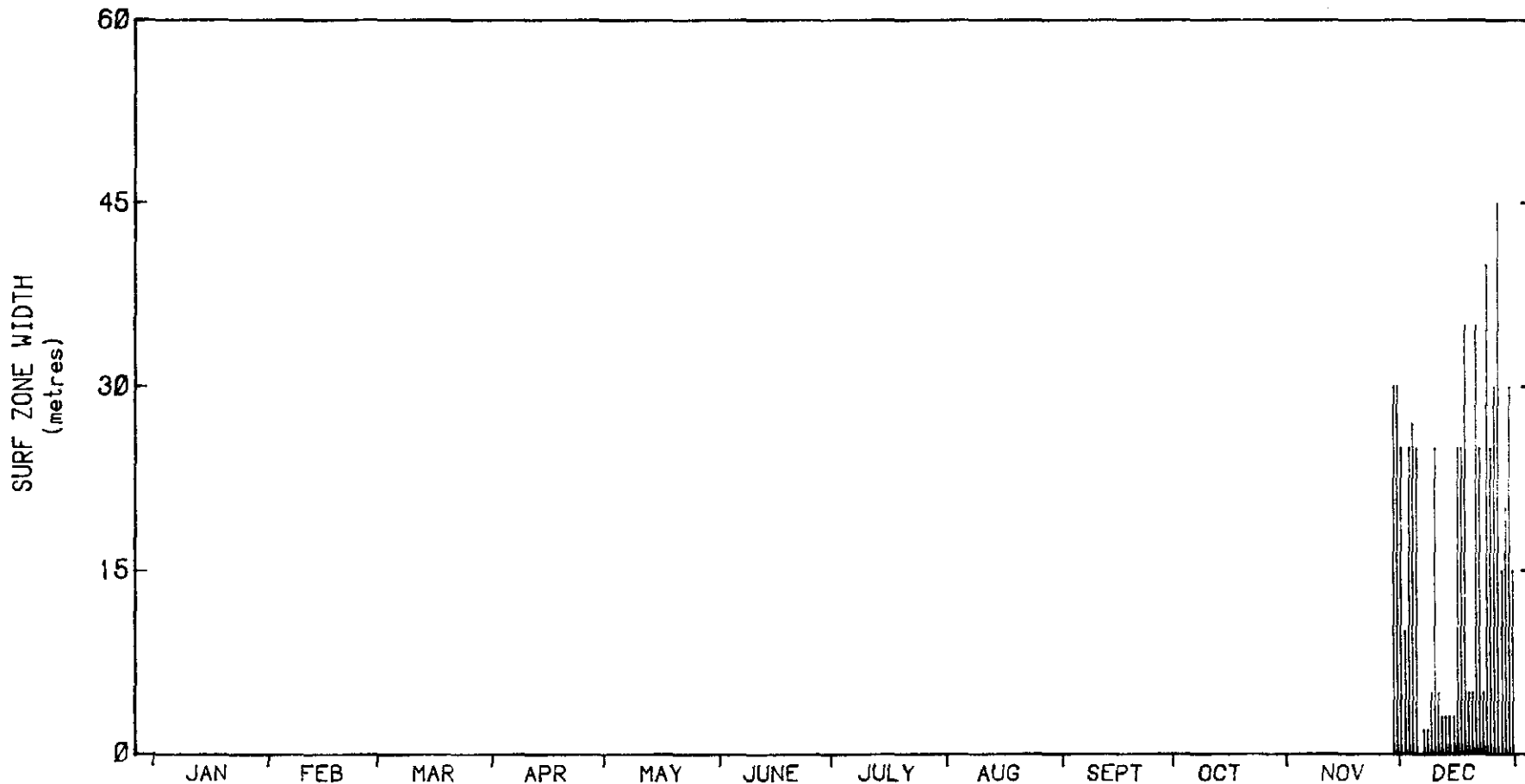
Figure 4

C 13.1





SURF ZONE WIDTH - MORNING 1977



SURF ZONE WIDTH SUMMARY - 1977

No. of Observations : 33

MORNING OBSERVATIONS

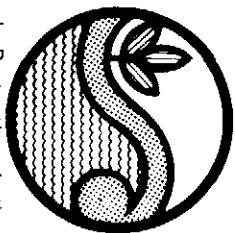
Mean Surf Zone Width = 18.3 m

COPE

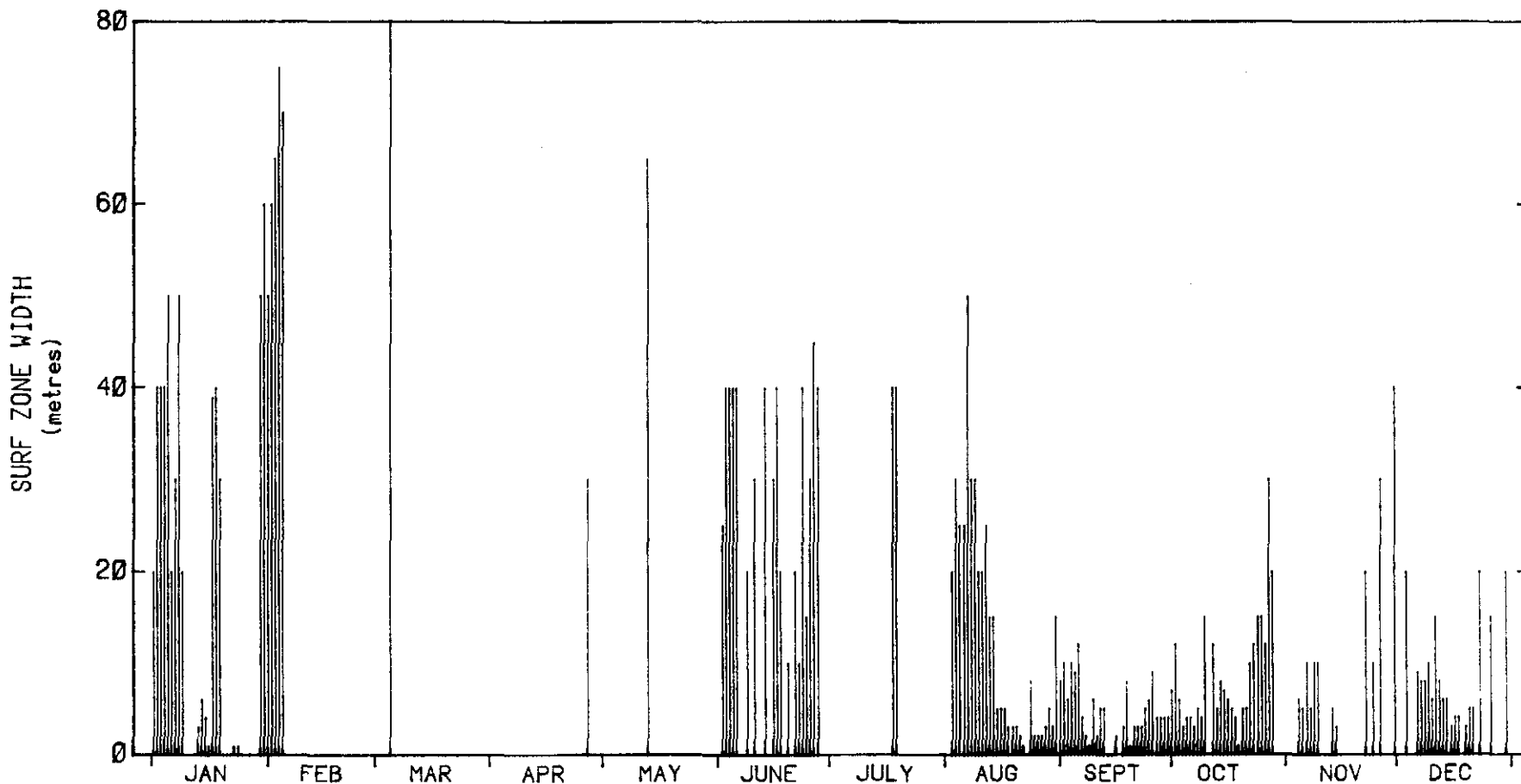
Noosa Beach

Figure 6

C 13.1



SURF ZONE WIDTH - MORNING 1978



SURF ZONE WIDTH SUMMARY - 1978

No. of Observations : 176

MORNING OBSERVATIONS

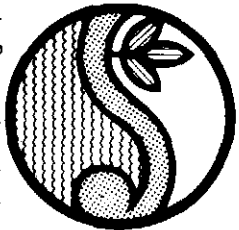
Mean Surf Zone Width = 15.7 m

COPE

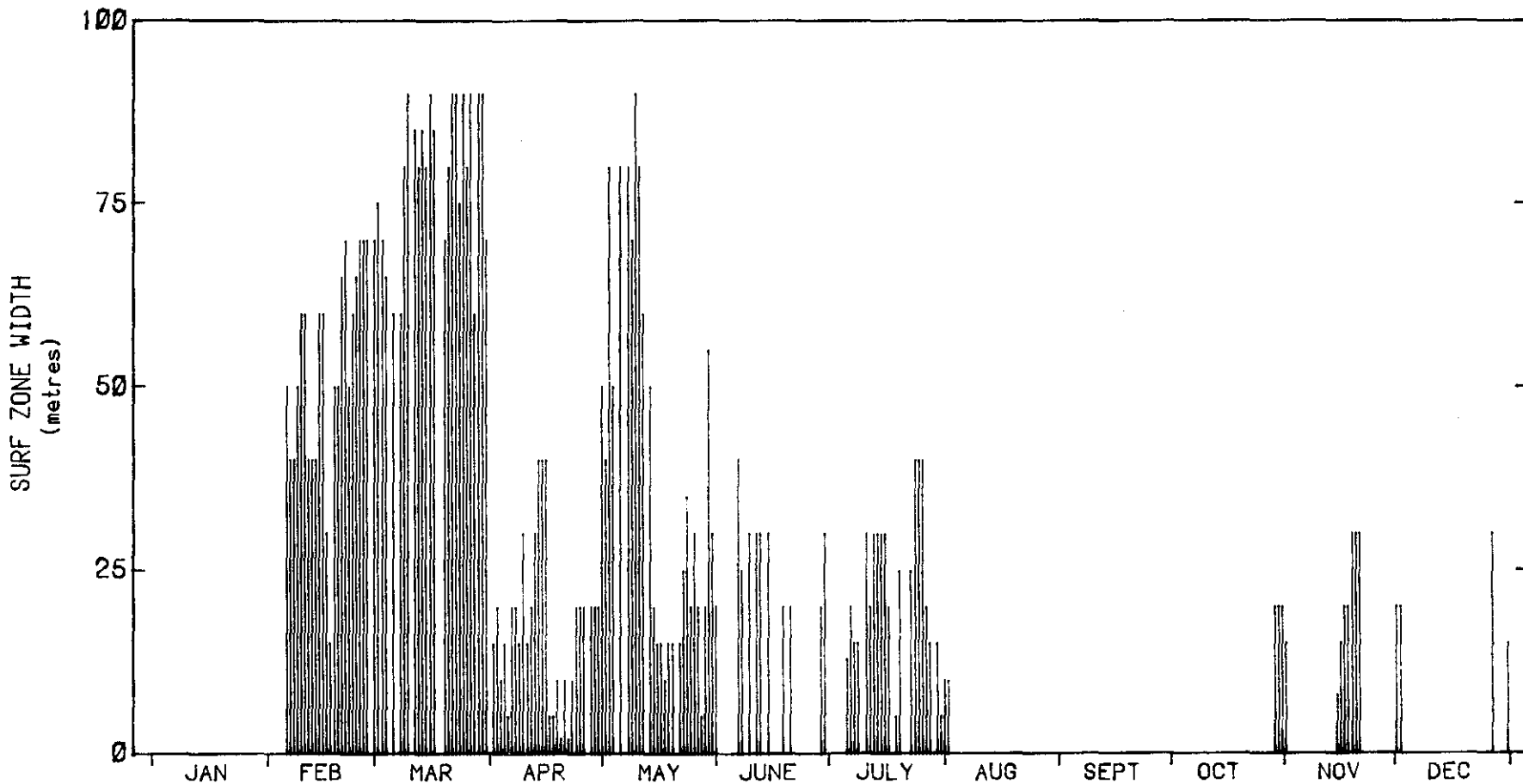
Noosa Beach

Figure 7

C 13.1



SURF ZONE WIDTH - AFTERNOON 1978



SURF ZONE WIDTH SUMMARY - 1978

No. of Observations : 156

AFTERNOON OBSERVATIONS

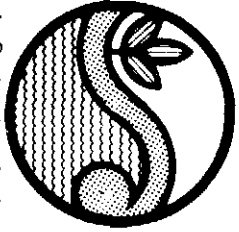
Mean Surf Zone Width = 38.1 m

COPE

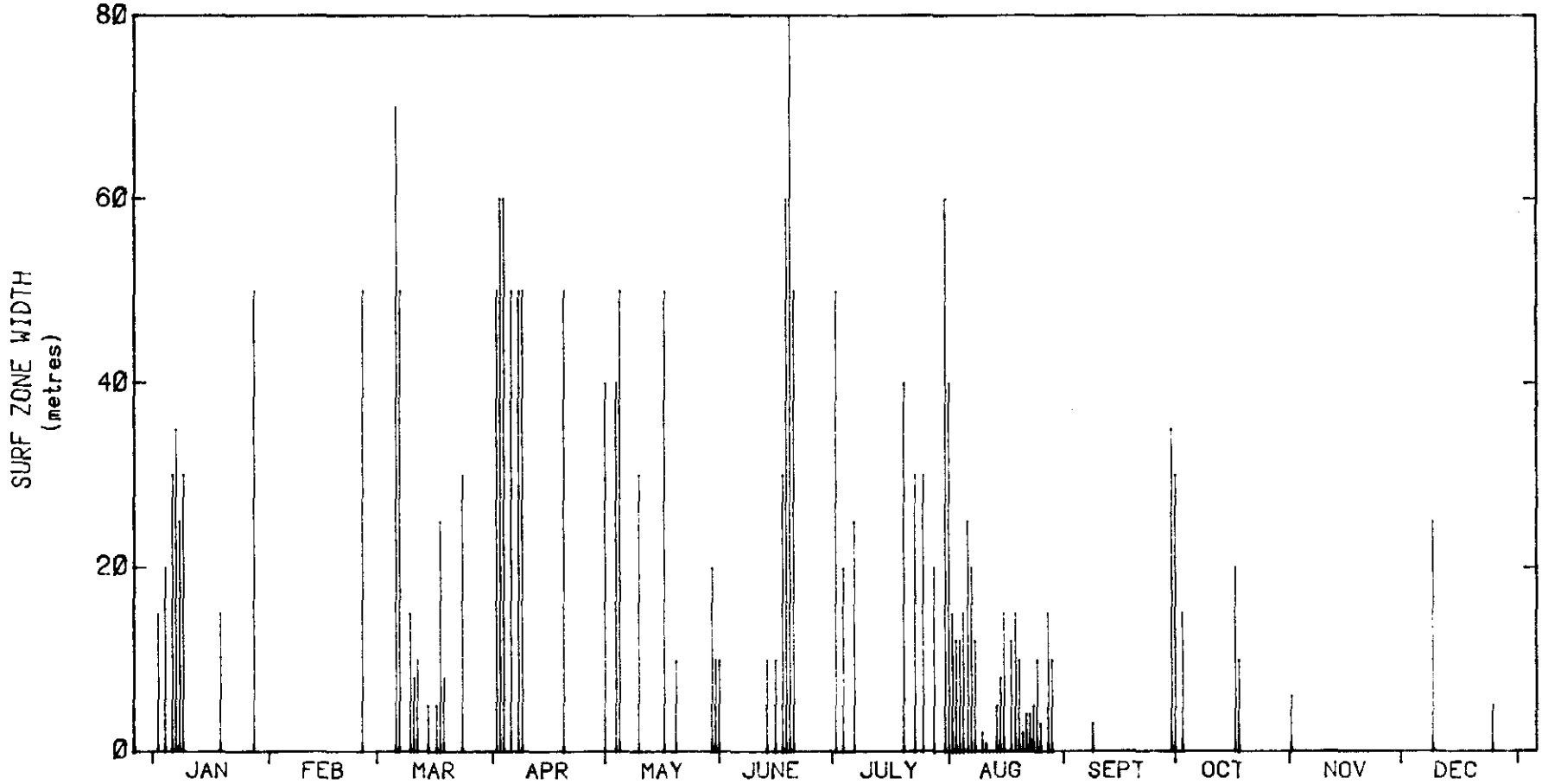
Noosa Beach

Figure 8

C 13.1



SURF ZONE WIDTH - MORNING 1979



SURF ZONE WIDTH SUMMARY - 1979

No. of Observations : 84

MORNING OBSERVATIONS

Mean Surf Zone Width = 24.5 m

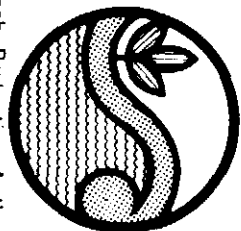
Indicates Offshore Bar Present

COPE

Noosa Beach

Figure 9

C 13.1



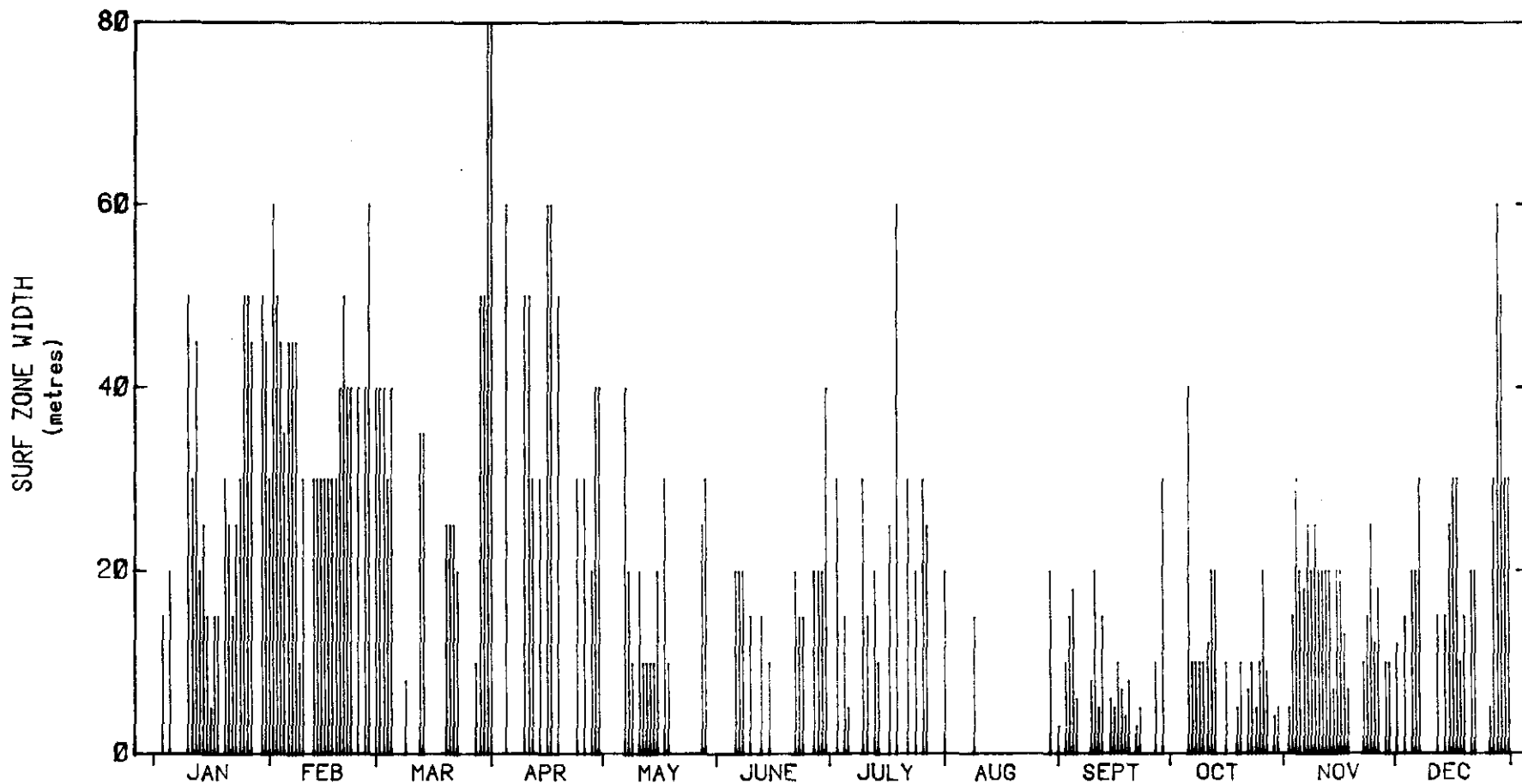
SURF ZONE WIDTH - AFTERNOON 1979

COPE - Coastal Observation Programme Engineering

NOOSA BEACH

NOOSA SHIRE

0802



SURF ZONE WIDTH SUMMARY - 1979

No. of Observations : 200

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 24.4 m

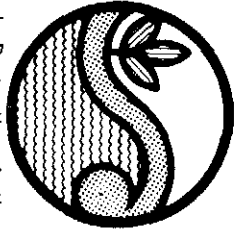
■ Indicates Offshore Bar Present

COPE

Noosa Beach

Figure 10

C 13.1



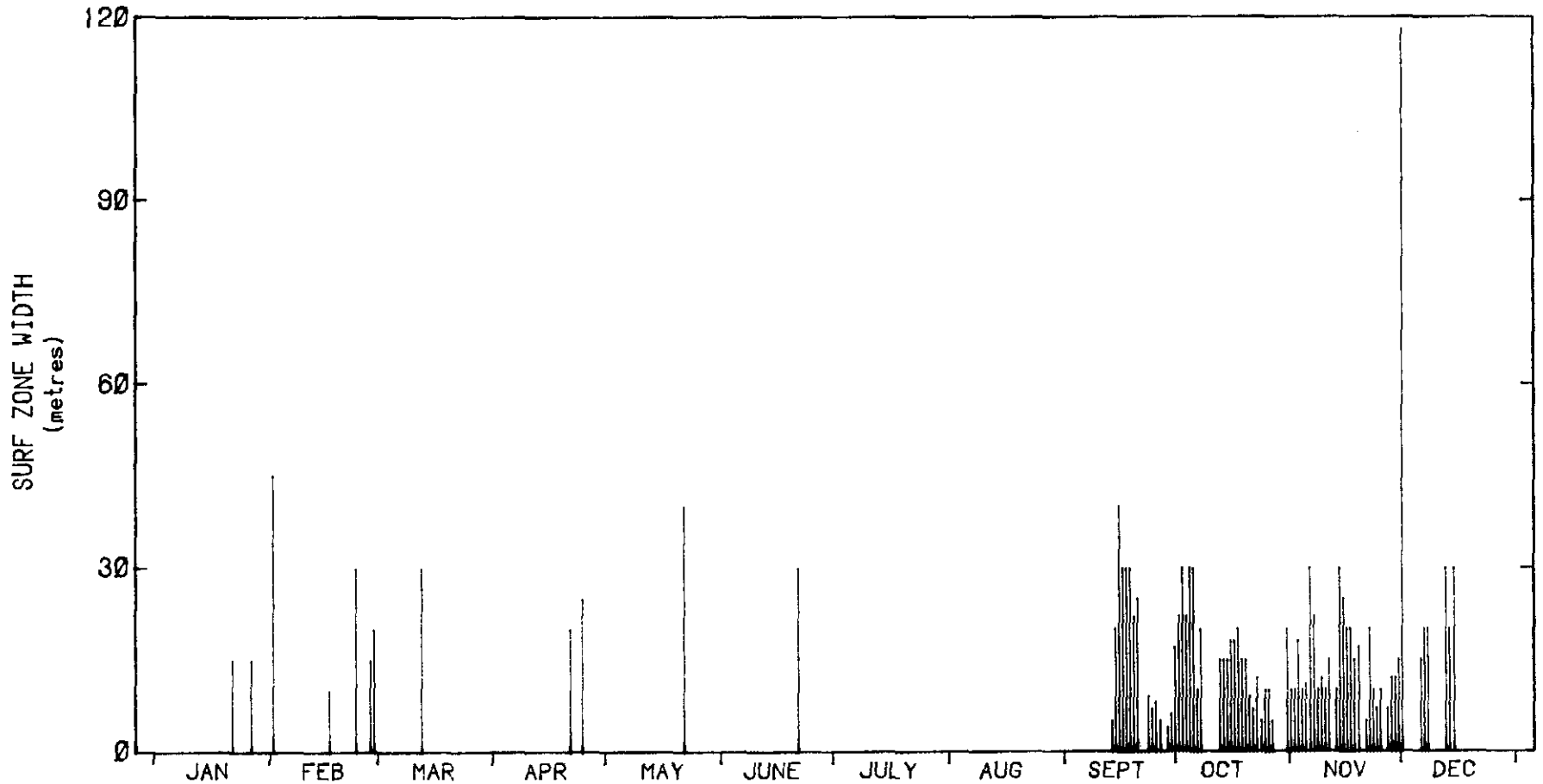
SURF ZONE WIDTH - MORNING 1980

COPE - Coastal Observation
Programme Engineering

NOOSA BEACH

NOOSA SHIRE

0802



SURF ZONE WIDTH SUMMARY - 1980

No. of Observations : 90

MORNING OBSERVATIONS

Mean Surf Zone Width = 17.5 m

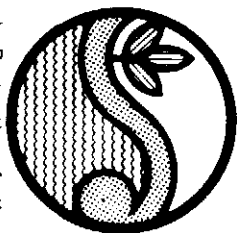
■ Indicates Offshore Bar Present

COPE

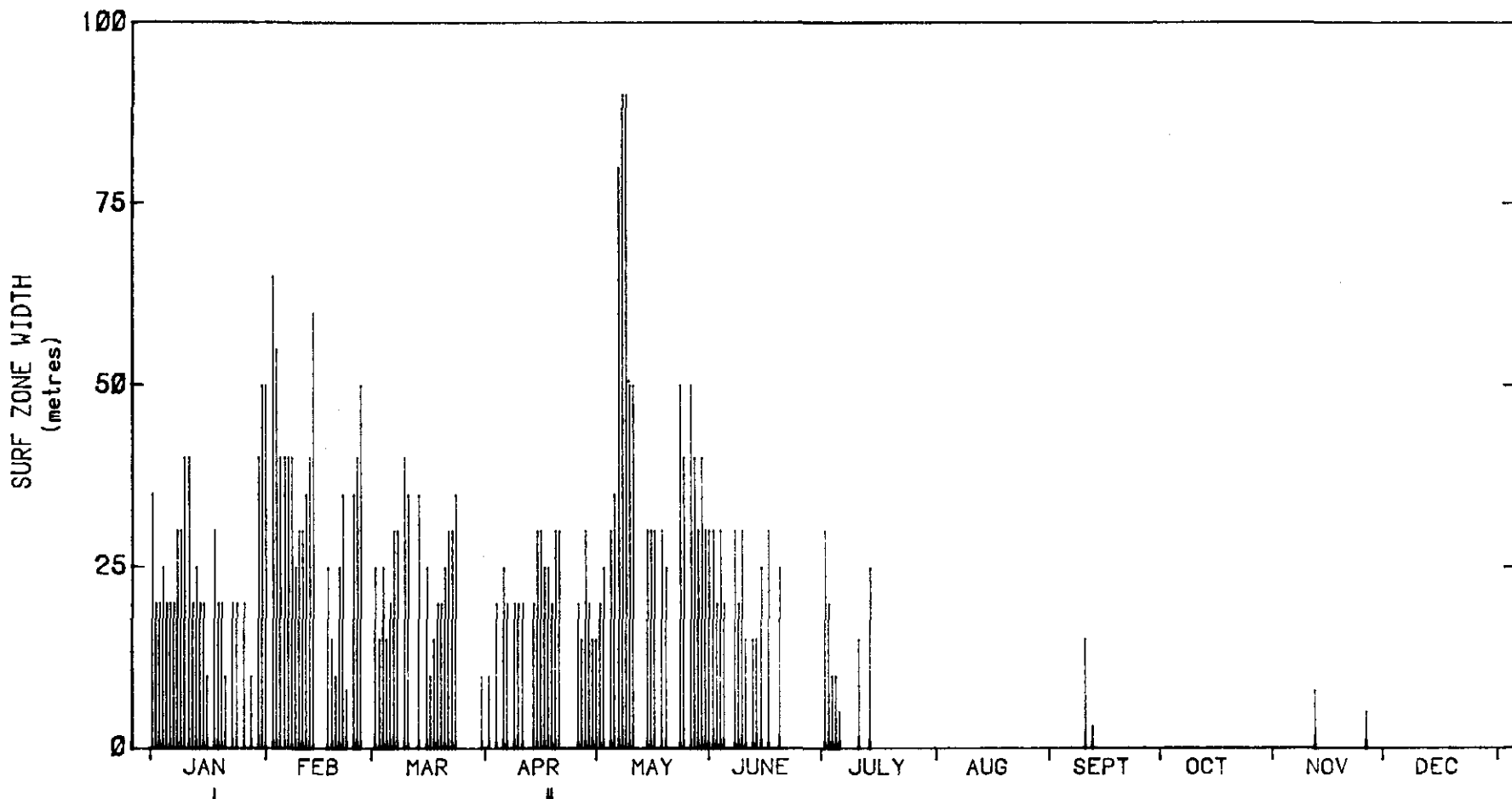
Noosa Beach

Figure 11

C 13.1



SURF ZONE WIDTH - AFTERNOON 1980



SURF ZONE WIDTH SUMMARY - 1980

No. of Observations : 135

AFTERNOON OBSERVATIONS

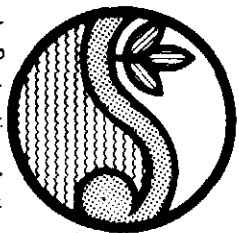
Mean Surf Zone Width = 27.8 m

COPE

Noosa Beach

Figure 12

C 13.1



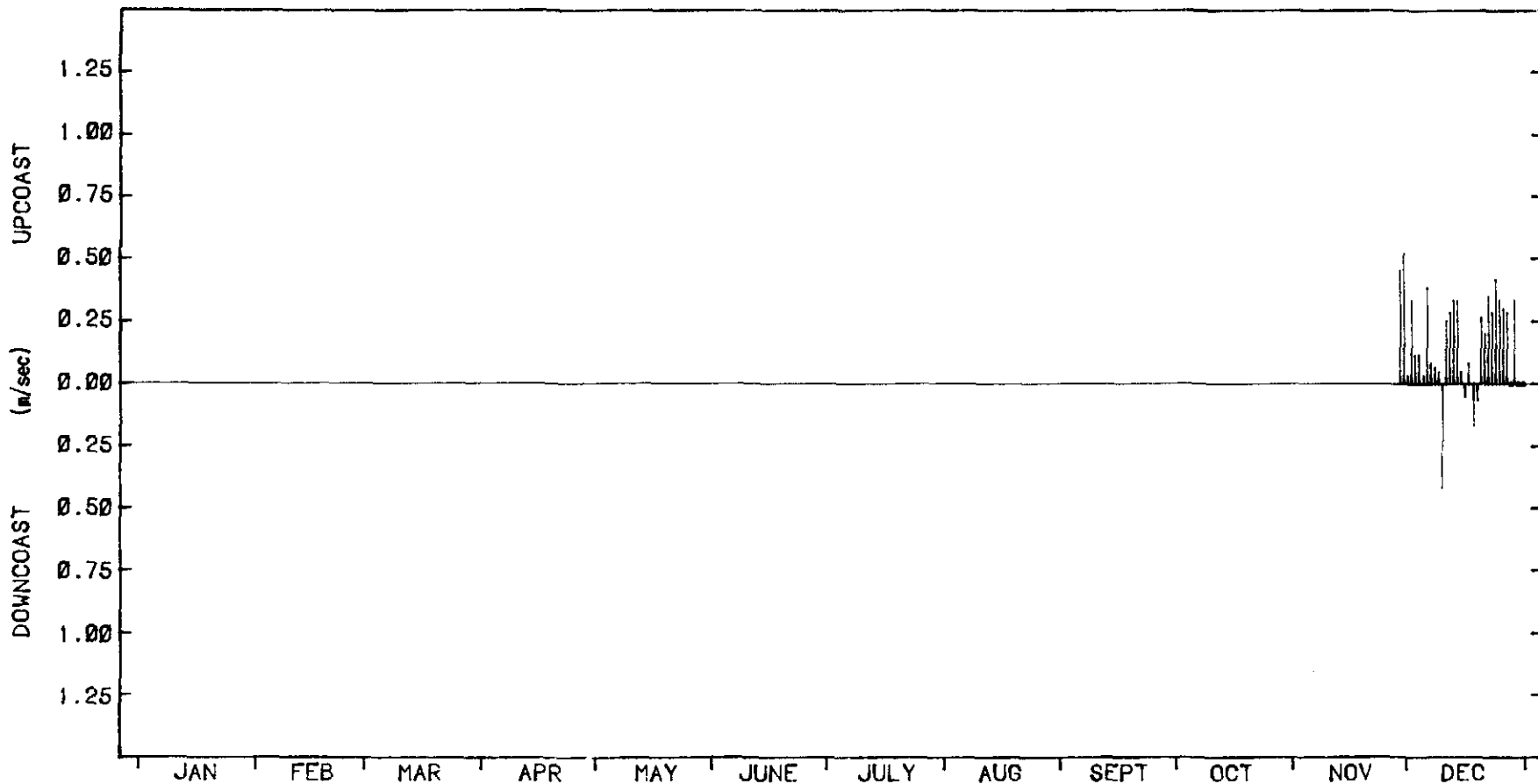
LITTORAL CURRENTS - MORNING 1977

COPE - Coastal Observation
Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



LITTORAL CURRENT SUMMARY - 1977

Mean Vel = 0.169 m/sec (up)

Mean Upcoast Vel = 0.242 m/sec

Mean Downcoast Vel = 0.175 m/sec

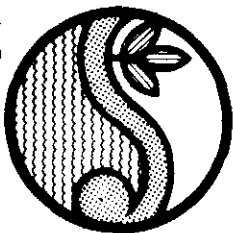
MORNING OBSERVATIONS - (33 recordings)

COPE

Noosa Beach

Figure 13

C 13.1



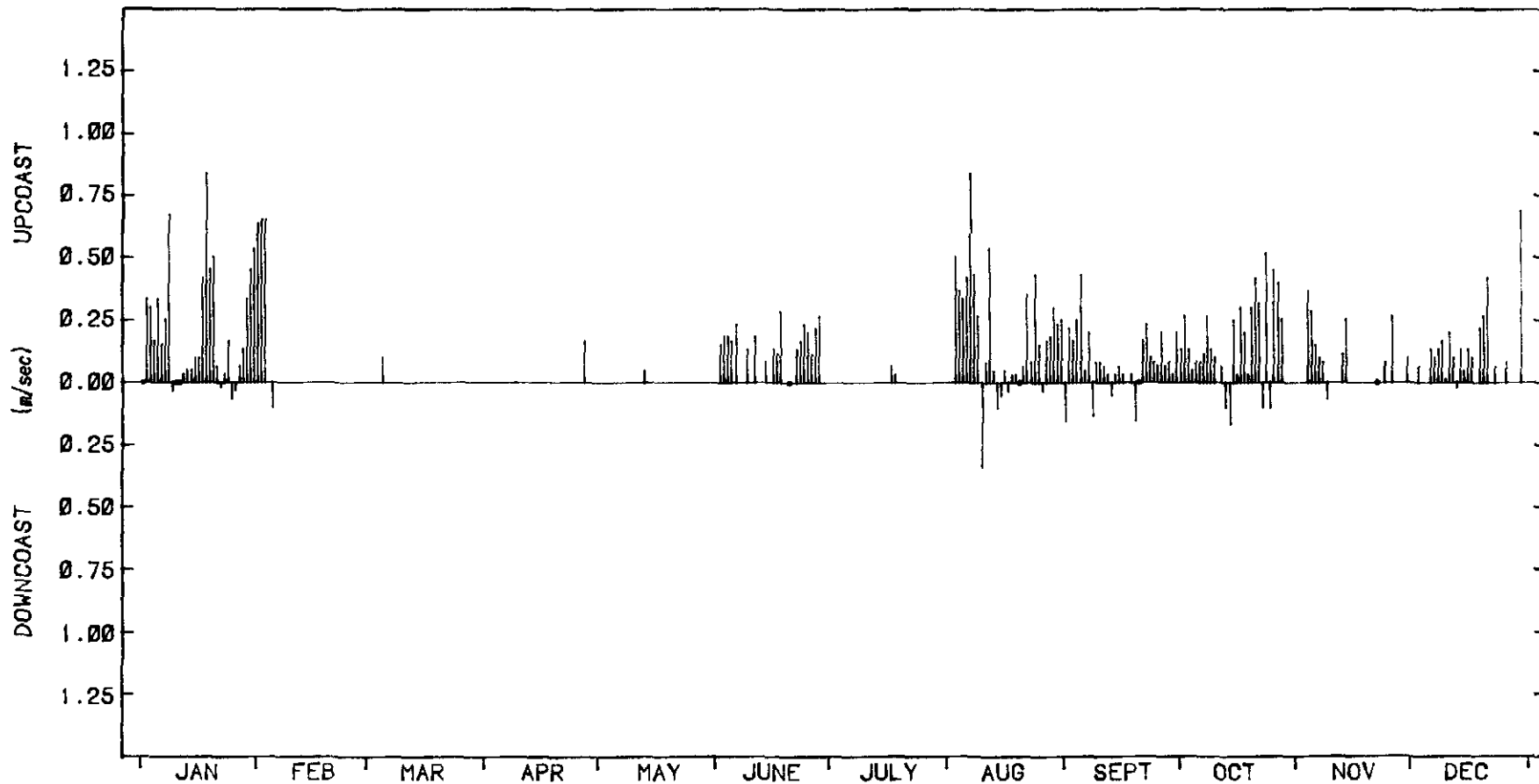
LITTORAL CURRENTS - MORNING 1978

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



LITTORAL CURRENT SUMMARY - 1978

Mean Vel = 0.166 m/sec (up)

Mean Upcoast Vel = 0.209 m/sec

Mean Downcoast Vel = 0.092 m/sec

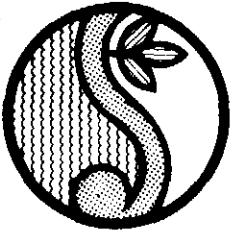
MORNING OBSERVATIONS - (175 recordings)

COPE

Noosa Beach

Figure 14

C 13.1



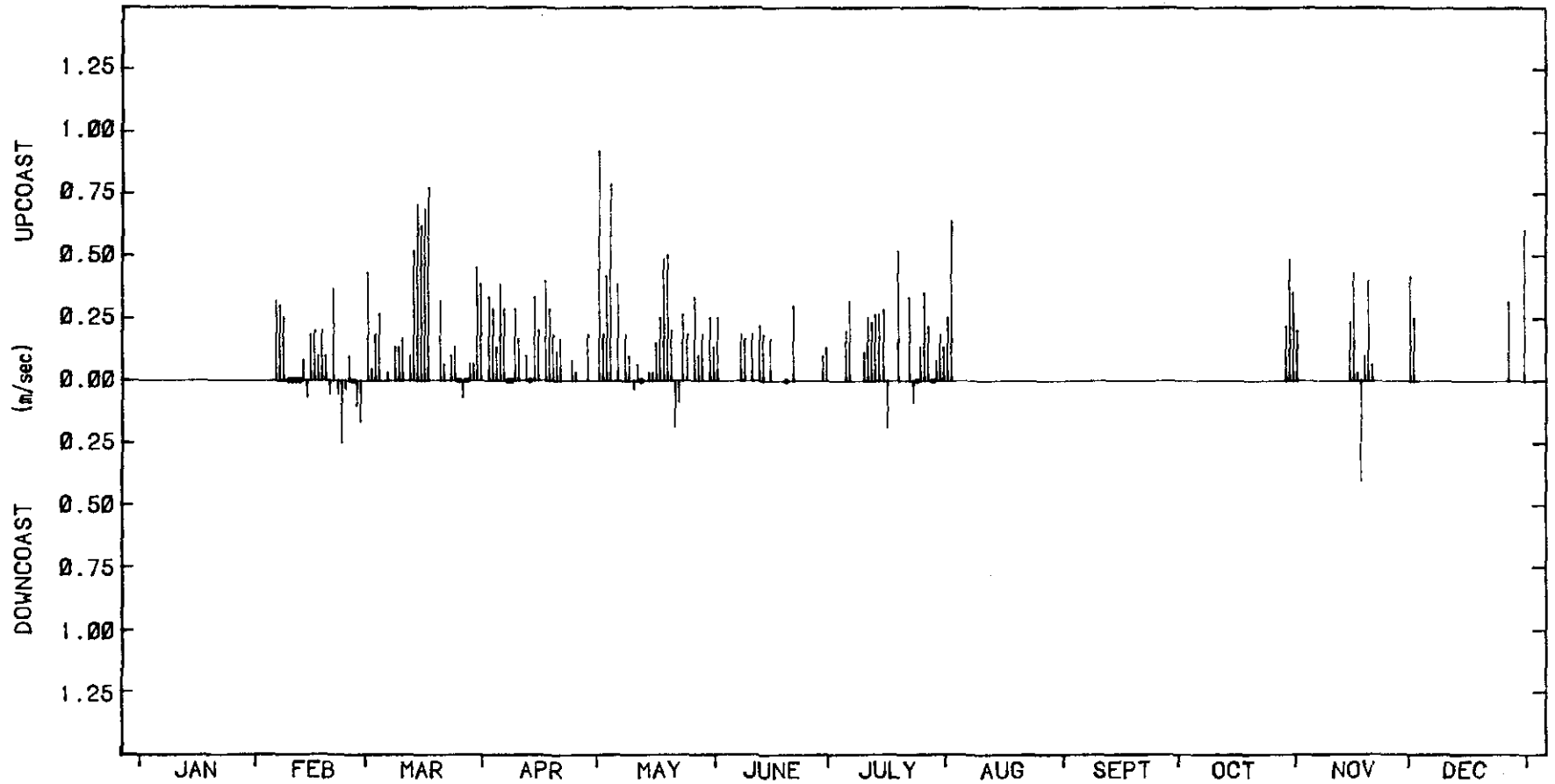
LITTORAL CURRENTS - AFTERNOON 1978

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



LITTORAL CURRENT SUMMARY - 1978

Mean Vel = 0.193 m/sec (up)

Mean Upcoast Vel = 0.256 m/sec

Mean Downcoast Vel = 0.125 m/sec

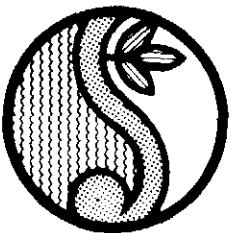
AFTERNOON OBSERVATIONS - (143 recordings)

COPE

Noosa Beach

Figure 15

C 13.1



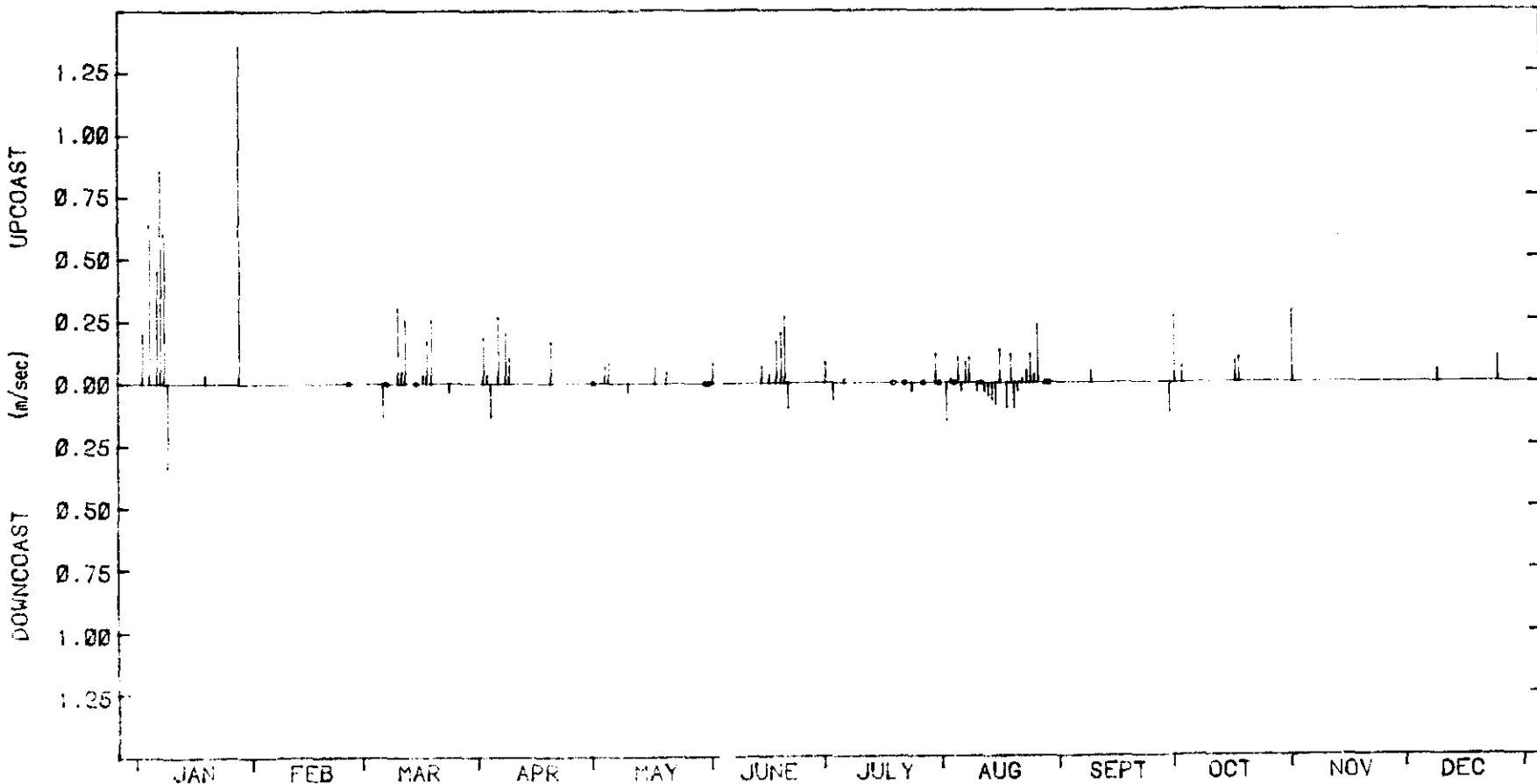
LITTORAL CURRENTS - MORNING 1979

COPE - Coastal Observation
Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



LITTORAL CURRENT SUMMARY - 1979

Mean Vel = 0.092 m/sec (up)

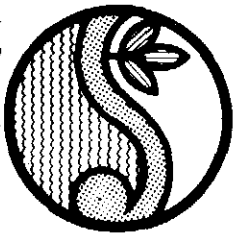
Mean Upcoast Vel = 0.185 m/sec

Mean Downcoast Vel = 0.088 m/sec

MORNING OBSERVATIONS - (84 recordings)

COPE
Noosa Beach

Figure 16
C 13.1



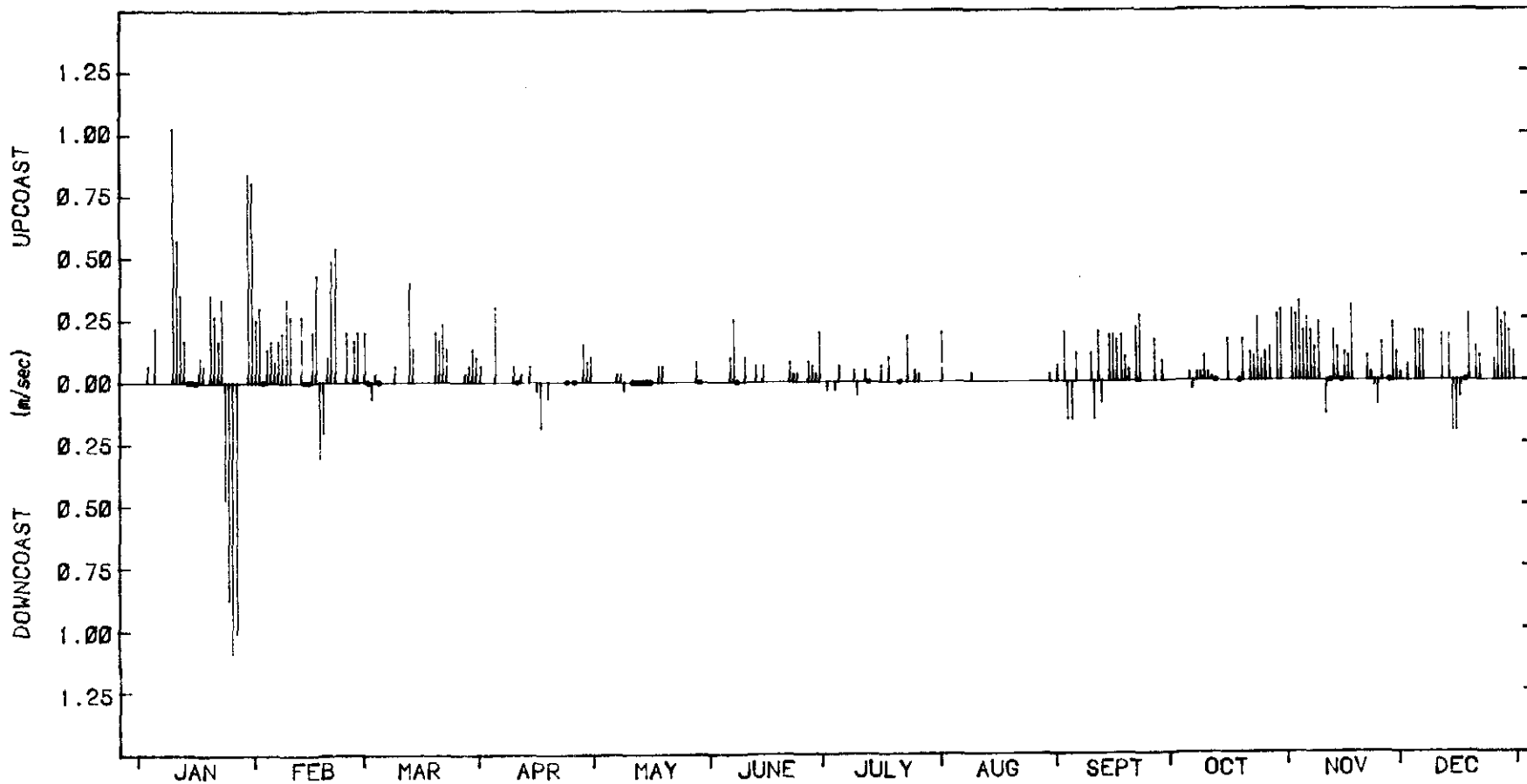
LITTORAL CURRENTS - AFTERNOON 1979

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



LITTORAL CURRENT SUMMARY - 1979

Mean Vel = 0.098 m/sec (up)

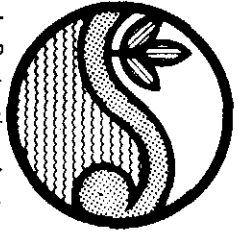
Mean Upcoast Vel = 0.172 m/sec

Mean Downcoast Vel = 0.228 m/sec

AFTERNOON OBSERVATIONS - (198 recordings)

COPE
Noosa Beach

Figure 17
C 13.1



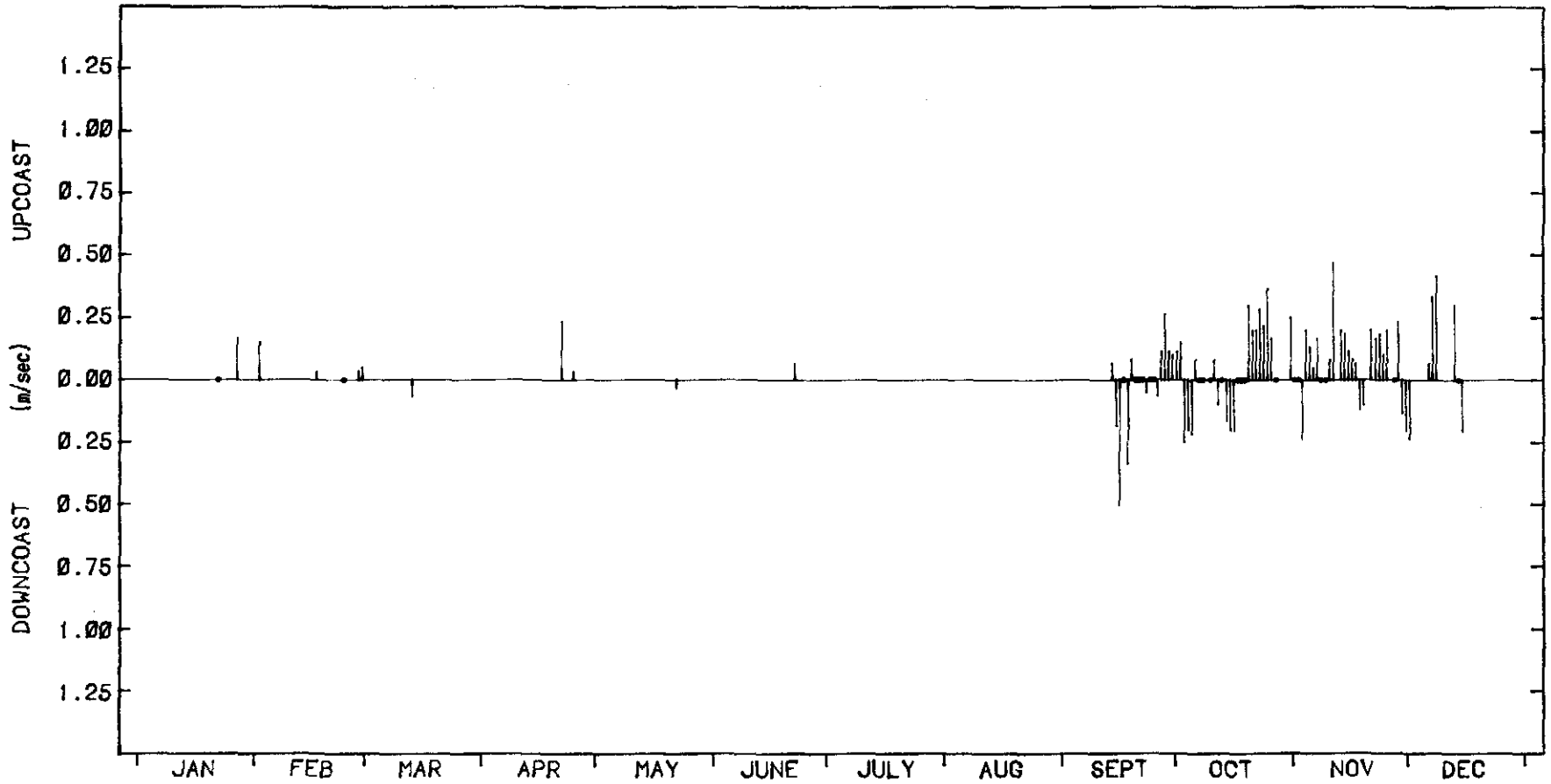
LITTORAL CURRENTS - MORNING 1980

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



LITTORAL CURRENT SUMMARY - 1980

Mean Vel = 0.046 m/sec (up)

Mean Upcoast Vel = 0.168 m/sec

Mean Downcoast Vel = 0.180 m/sec

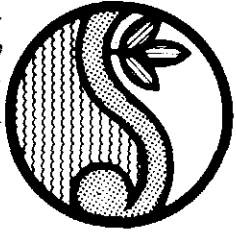
MORNING OBSERVATIONS - (90 recordings)

COPE

Noosa Beach

Figure 18

C 13.1



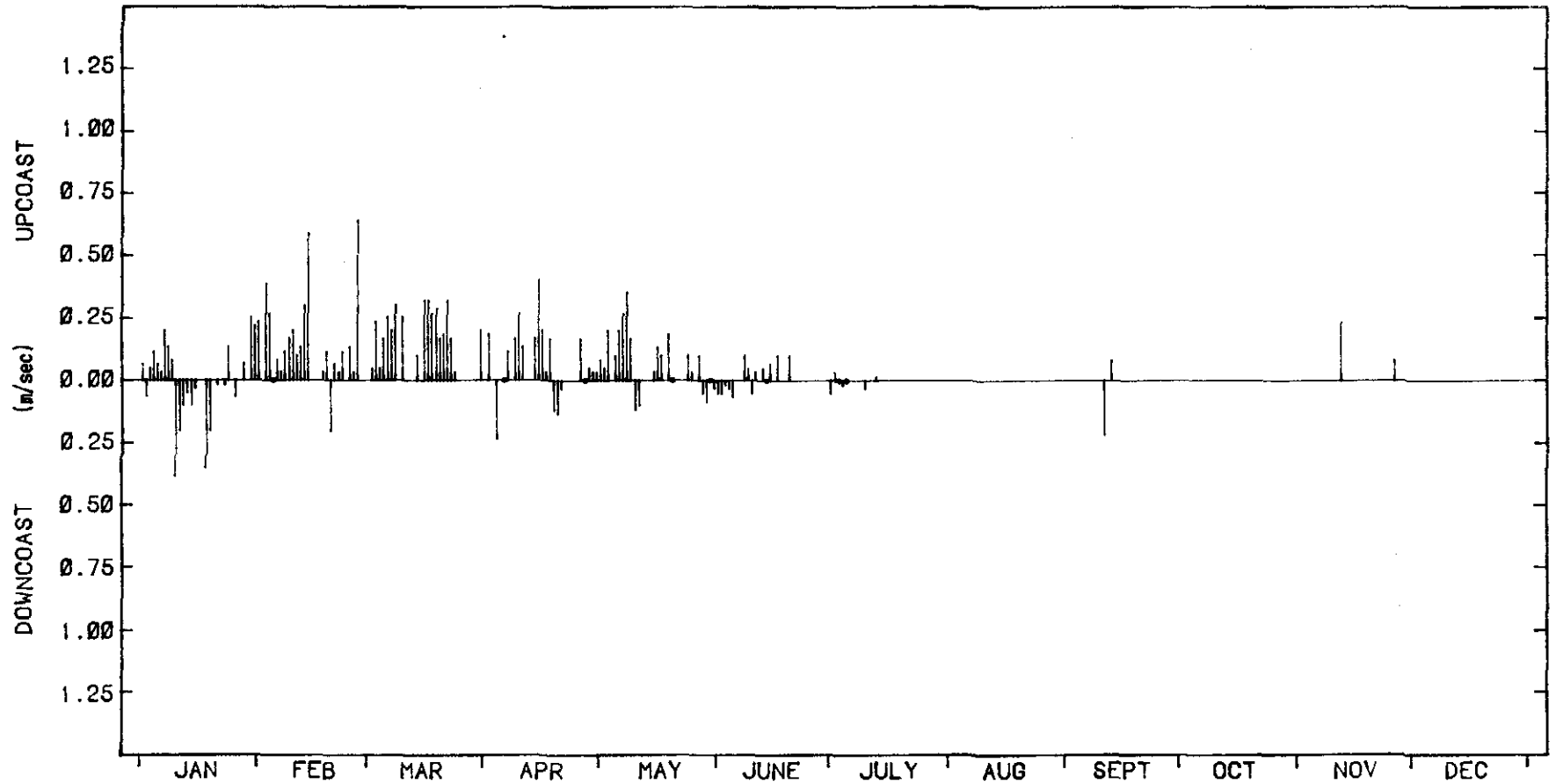
LITTORAL CURRENTS - AFTERNOON 1980

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



LITTORAL CURRENT SUMMARY - 1980

Mean Vel = 0.083 m/sec (up)

Mean Upcoast Vel = 0.154 m/sec

Mean Downcoast Vel = 0.102 m/sec

AFTERNOON OBSERVATIONS - (132 recordings)

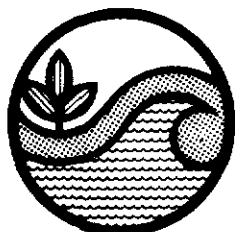
COPE

Noosa Beach

Figure 19

C 13.1

Values of Berm Crest Elevations were not measured.



Beach Protection Authority

BERM CREST ELEVATIONS 1977

COPE

Noosa

Figure 20

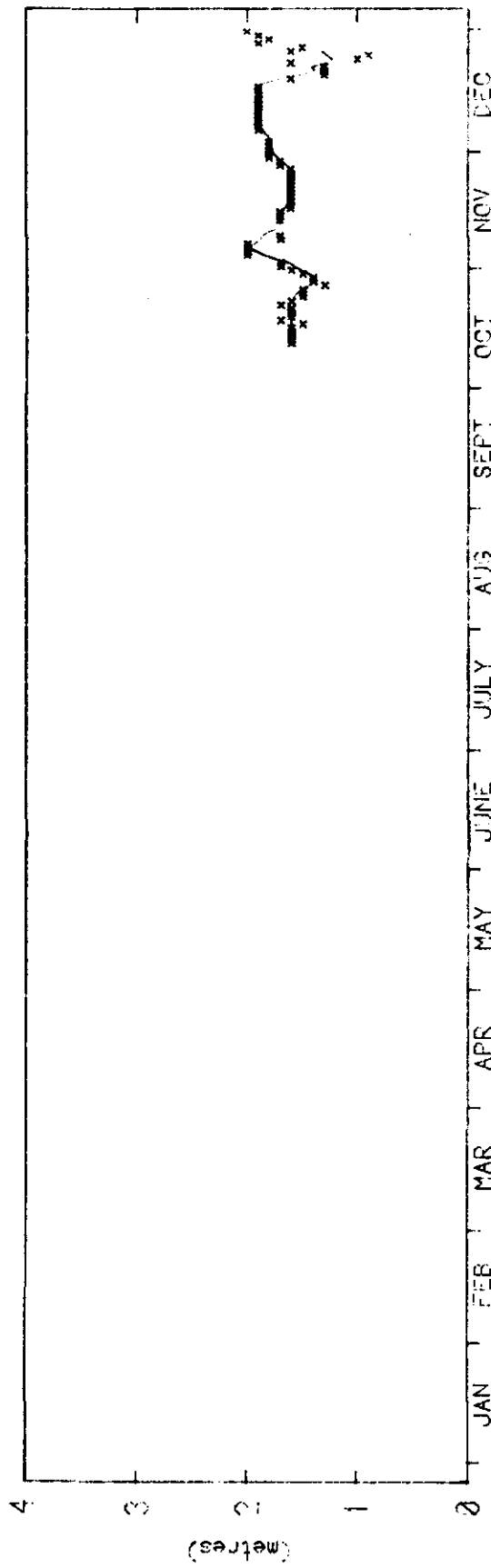
C 13.1

COPE - Coastal Observation
Programme Engineering

NOOSA SHIRE

NOOSA BEACH

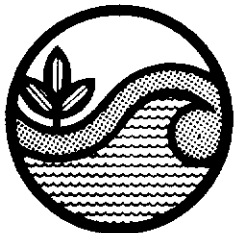
0802



BERM CREST ELEVATION - 1978

No. of Observations : 74

— Indicates Five Day Moving Average



Beach Protection Authority

BERM CREST ELEVATION - 1978

COPE
Noosa Beach

Figure 21
C 13.1



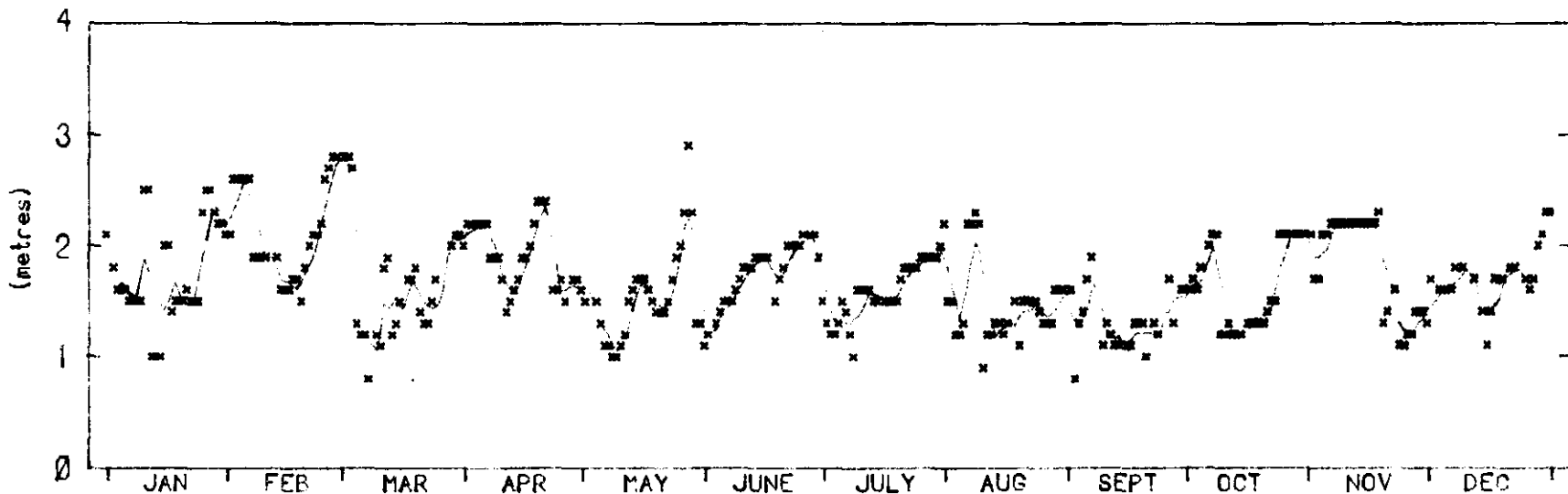
COPE - Coastal Observation
Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802

BERM CREST ELEVATION - 1979



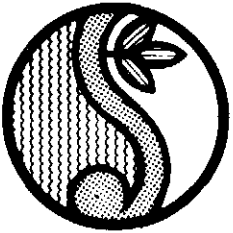
BERM CREST ELEVATION - 1979

No. of Observations : 327

— indicates Five Day Moving Average

COPE
Noosa Beach

Figure 22
C 13.1



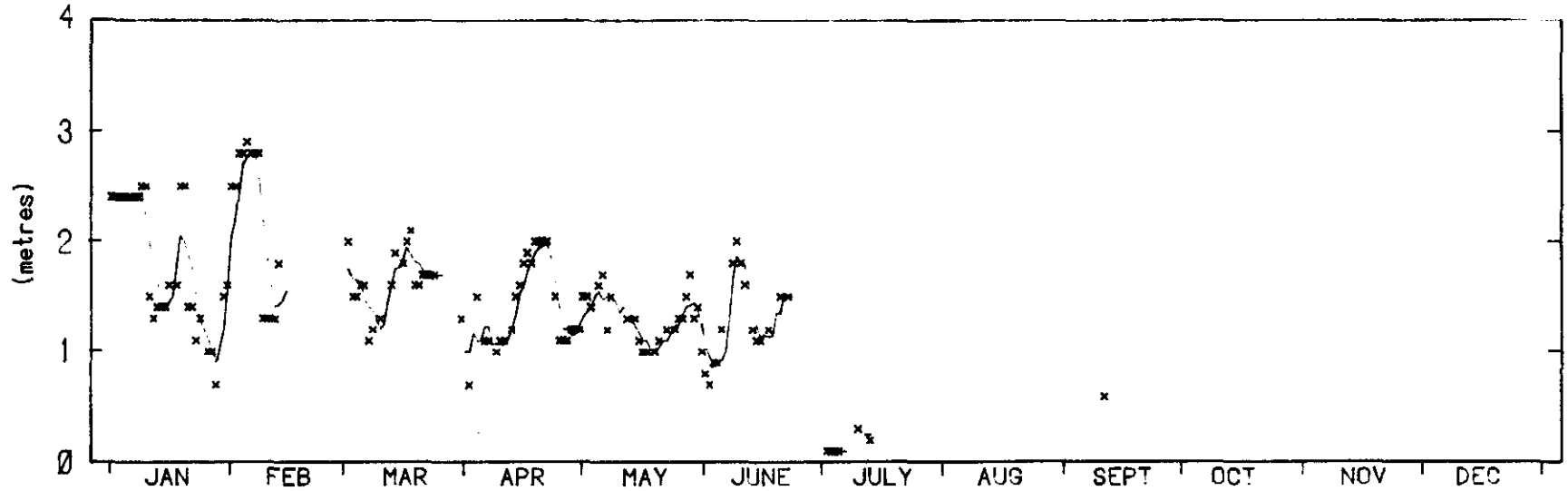
COPE - Coastal Observation
Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802

BERM CREST ELEVATION - 1980



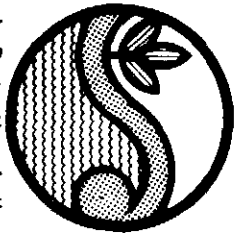
BERM CREST ELEVATION - 1980

No. of Observations : 130

^ Indicates Five Day Moving Average

COPE
Noosa Beach

Figure 23
C 13.1



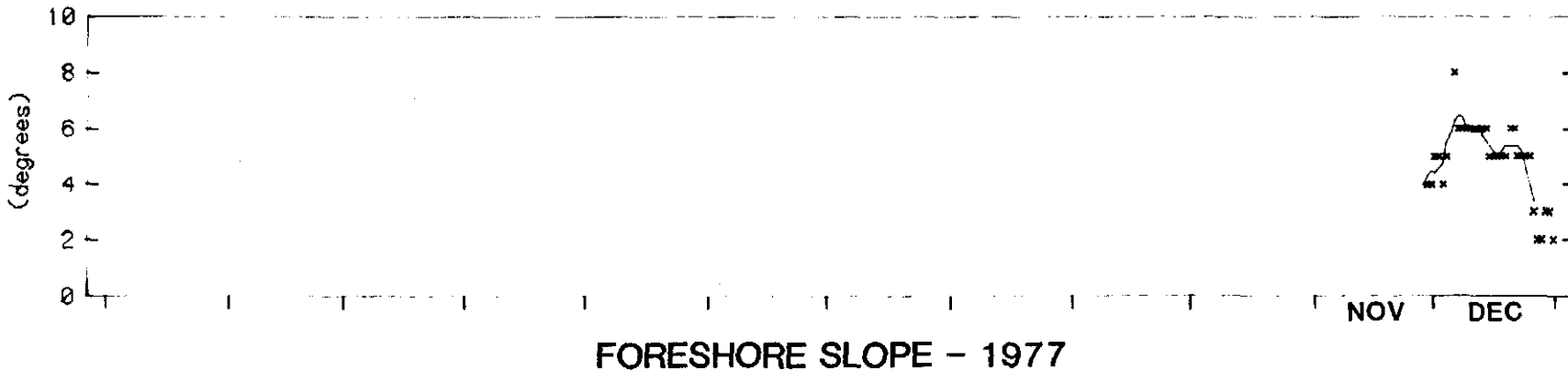
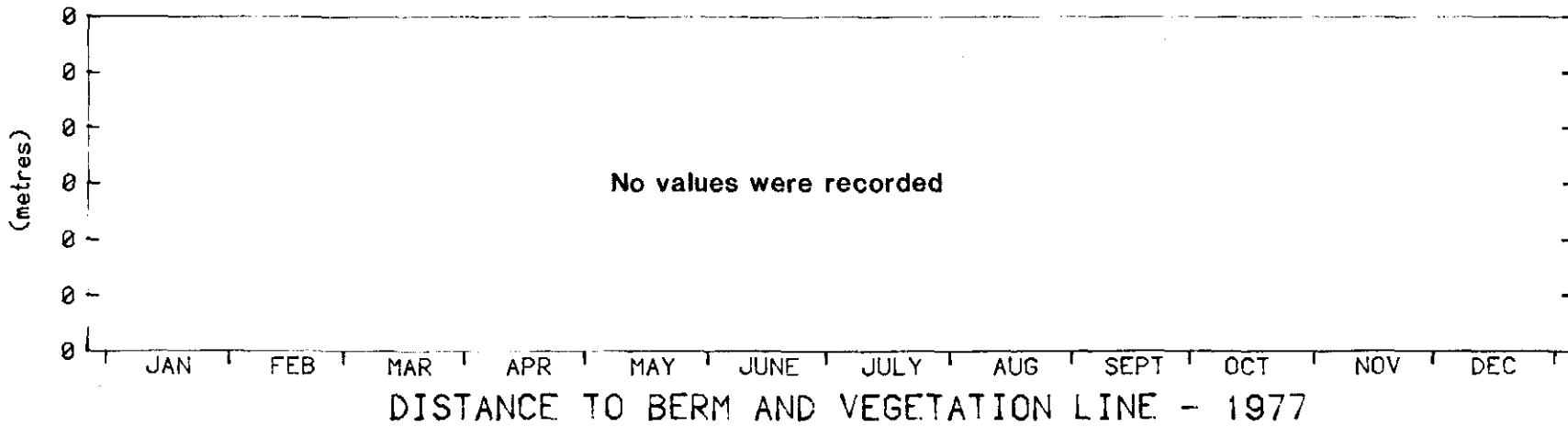
BEACH PROFILE PARAMETERS - 1977

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

NOOSA BEACH

0802



Five day moving average

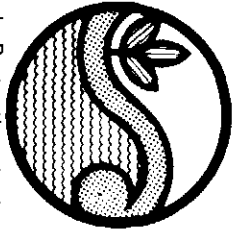
No. of Observations : 32

COPE

Noosa Beach

Figure 24

C 13.1



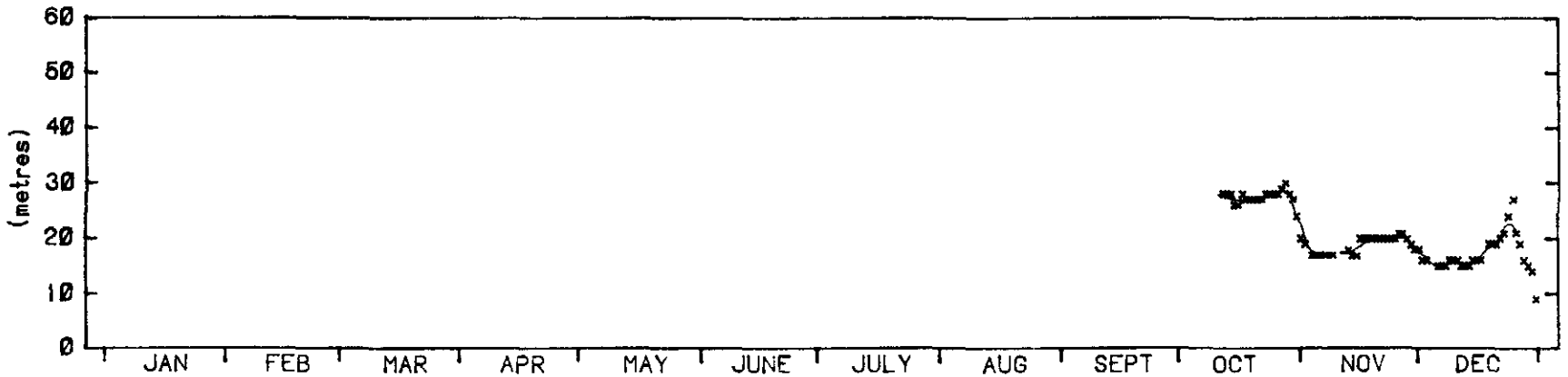
BEACH PROFILE PARAMETERS - 1978

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

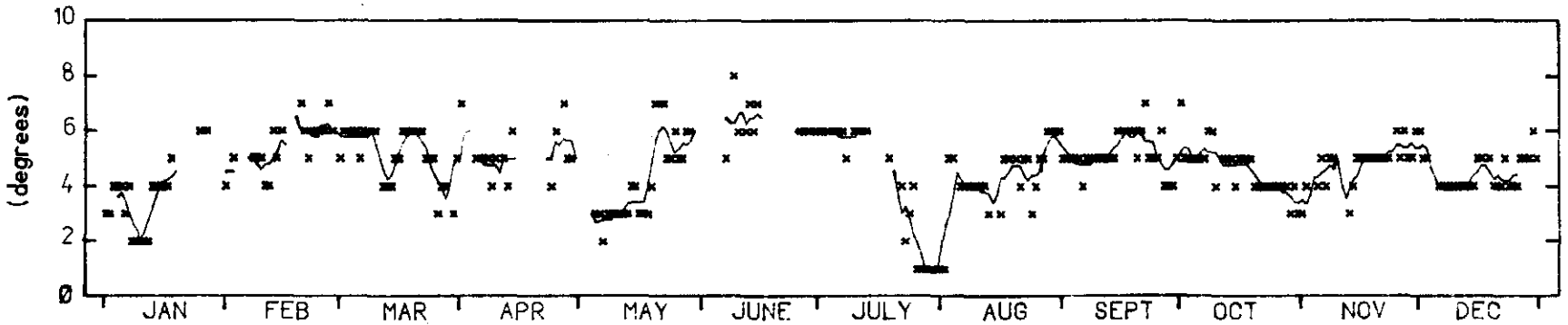
NOOSA BEACH

0802



DISTANCE TO BERM AND VEGETATION LINE - 1978

Indicates Distance to Berm : 73 Observations



FORESHORE SLOPE - 1978

Five Day Moving Average

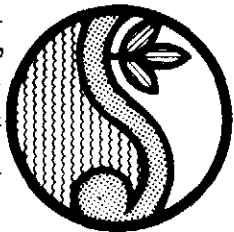
No. of Observations : 310

COPE

Noosa Beach

Figure 25

C 13.1



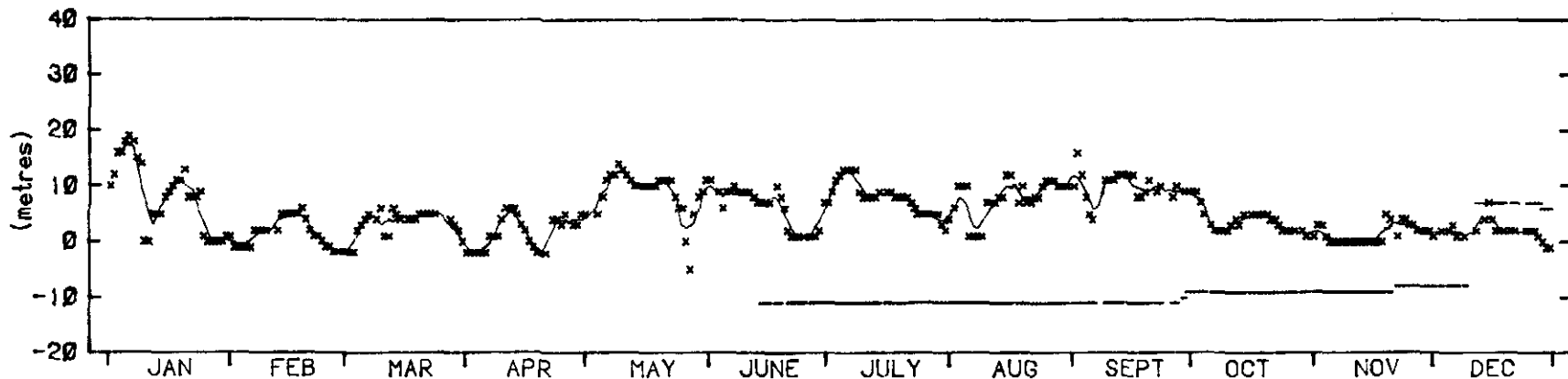
BEACH PROFILE PARAMETERS - 1979

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

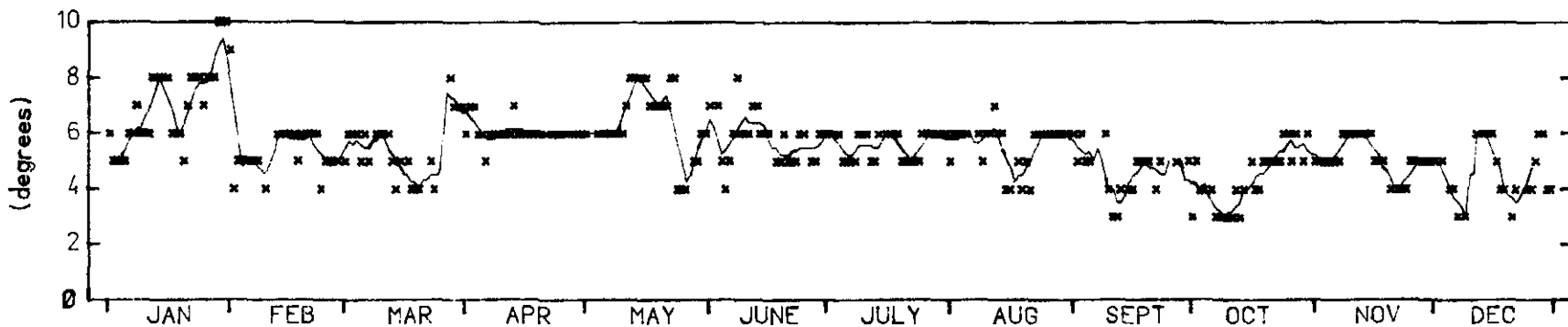
NOOSA BEACH

0802



DISTANCE TO BERM AND VEGETATION LINE - 1979

x x x x Indicates Distance to Berm : 327 Observations
 — Indicates Distance to Vegetation Line : 174 Observations



FORESHORE SLOPE - 1979

Five Day Moving Average

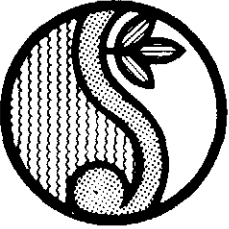
No. of Observations : 317

COPE

Noosa Beach

Figure 26

C 13.1



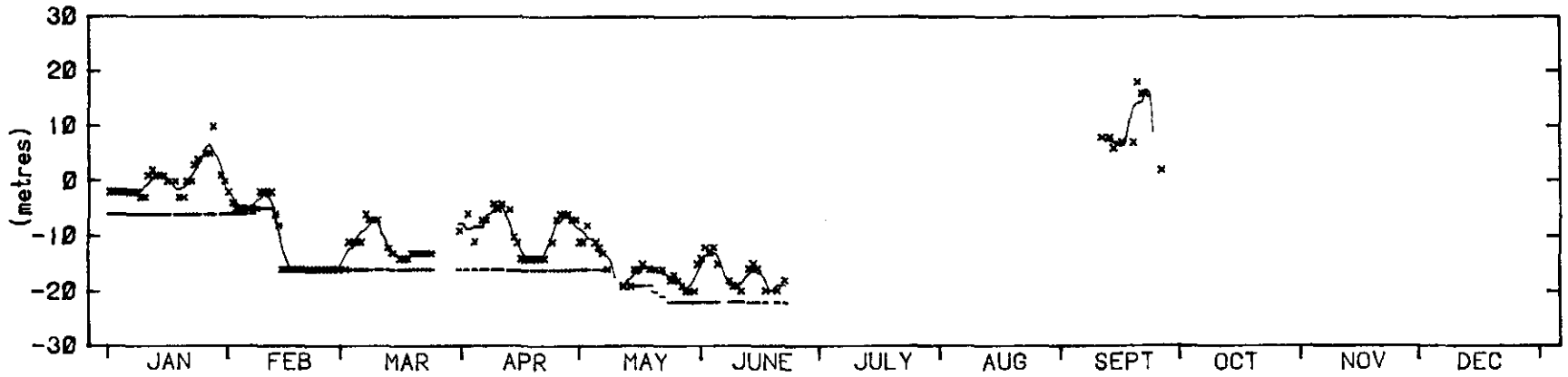
BEACH PROFILE PARAMETERS - 1980

COPE - Coastal Observation Programme Engineering

NOOSA SHIRE

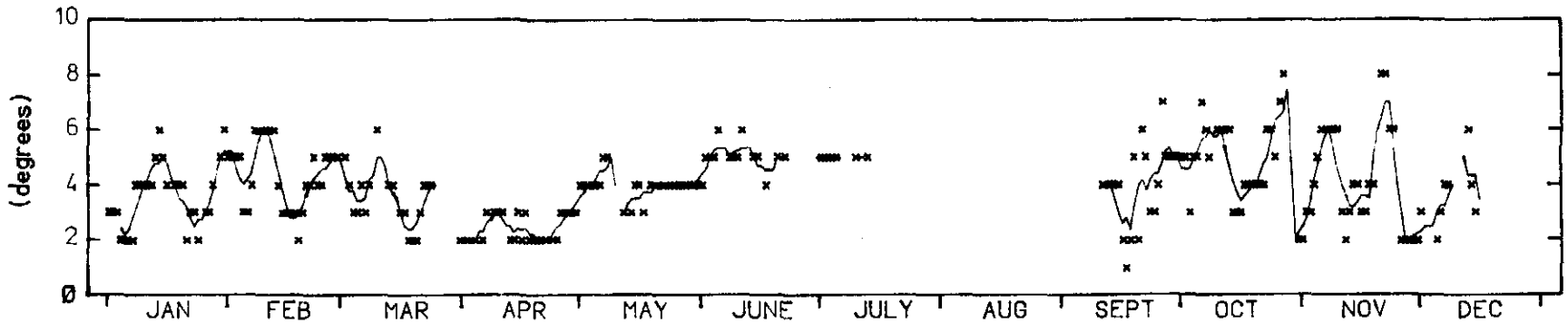
NOOSA BEACH

0802



DISTANCE TO BERM AND VEGETATION LINE - 1980

x x x x Indicates Distance to Berm : 148 Observations
 ——— Indicates Distance to Vegetation Line : 139 Observations



FORESHORE SLOPE - 1980

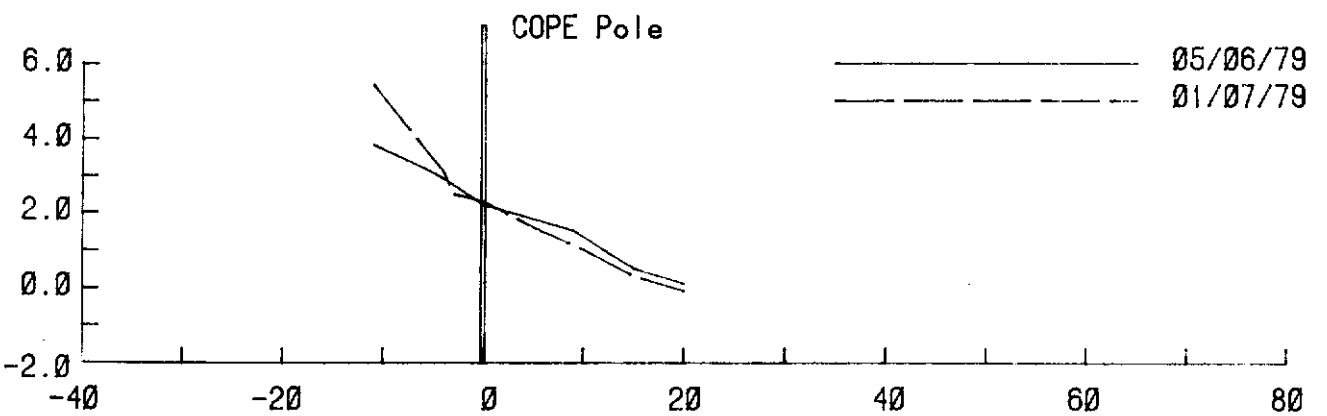
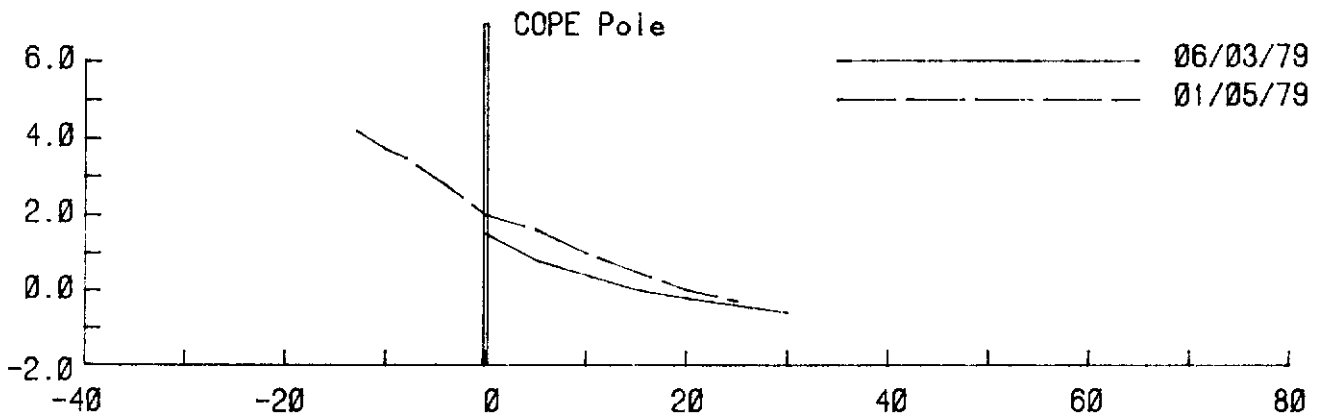
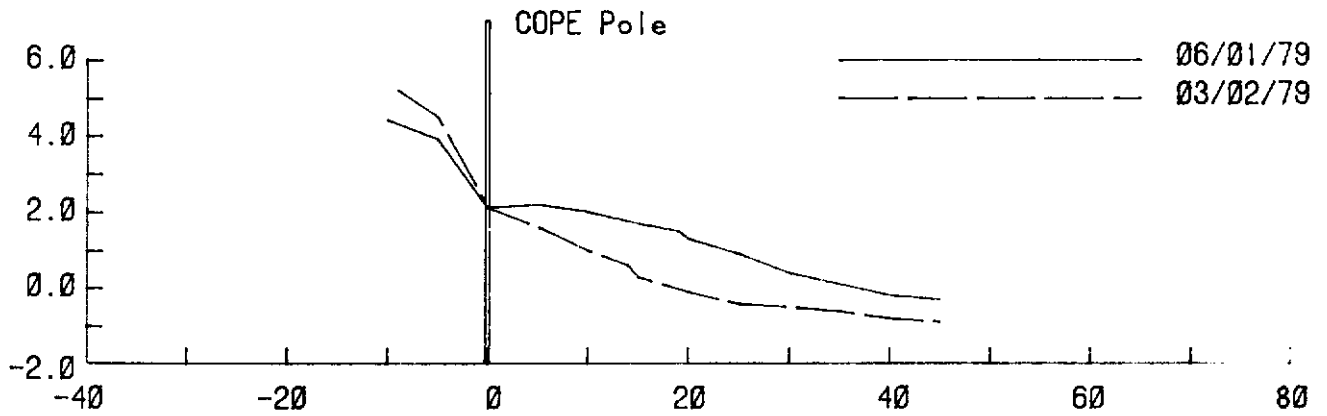
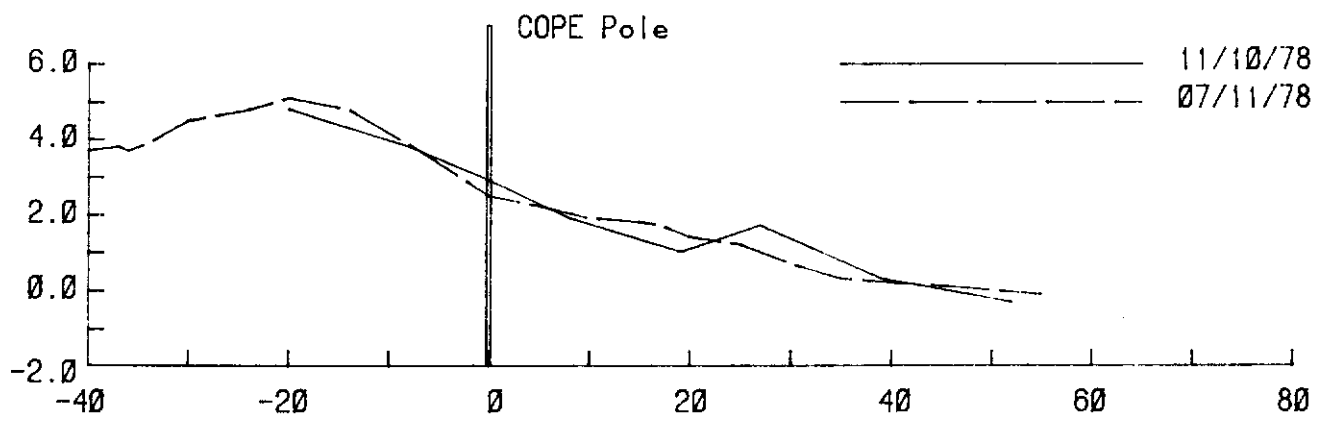
Five Day Moving Average

No. of Observations : 227

COPE

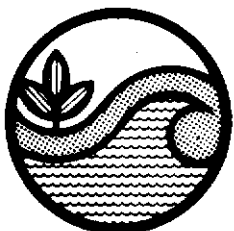
Noosa Beach

Figure 27
C 13.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



Beach Protection Authority

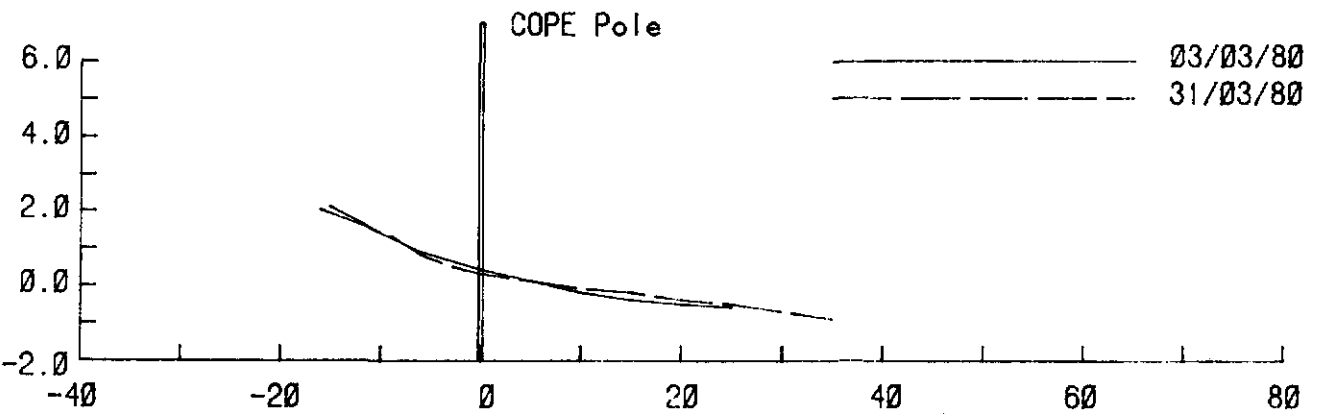
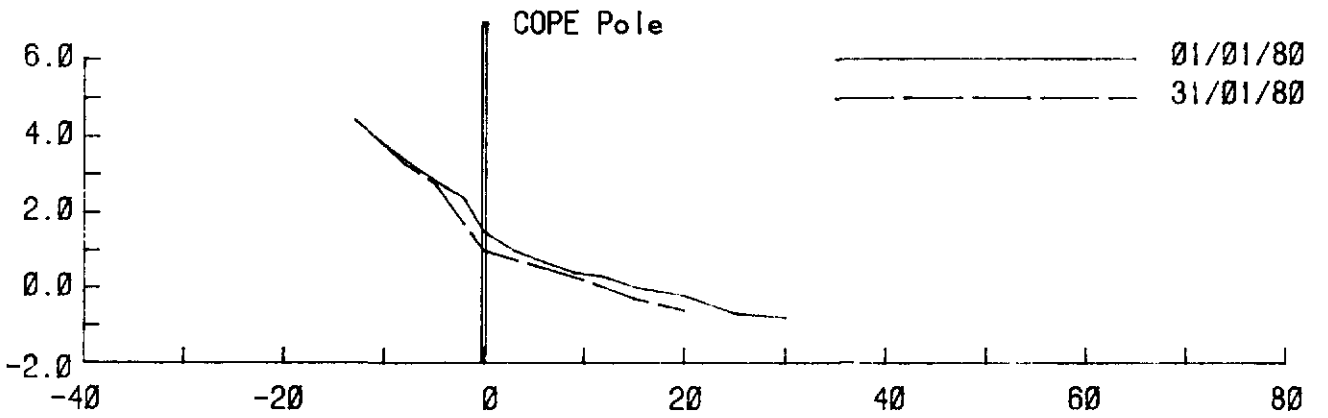
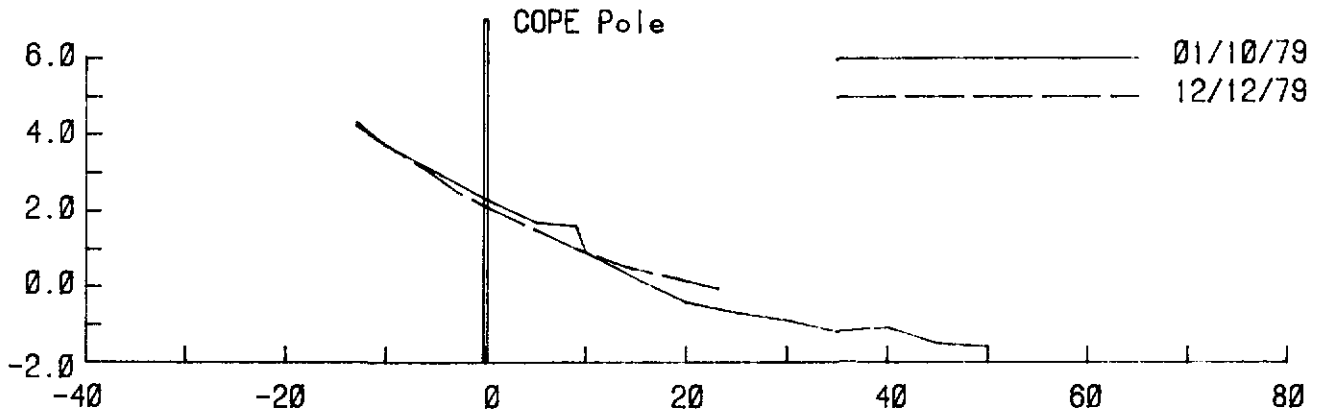
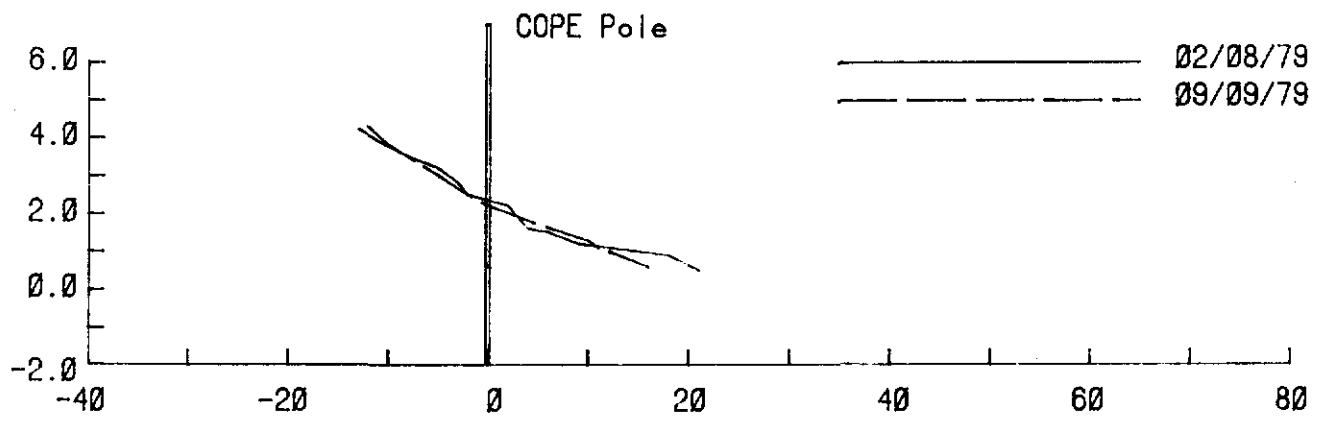
MONTHLY BEACH PROFILES

1978-1979

COPE
Noosa Beach

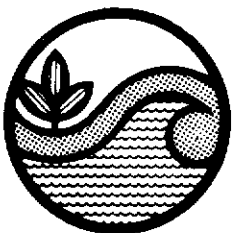
Figure 28

C 13.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



Beach Protection Authority

MONTHLY BEACH PROFILES

1979-1980

COPE
Noosa Beach

Figure 29

C 13.1