

Buddina Beach — City of Caloundra

For the years 1979 to 1990



**Beach Protection
Authority
Queensland**

March 1993

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Abstract

This report provides a summary of primary analyses of C.O.P.E. data on wind, wave and beach processes observed at Buddina Beach in the City of Caloundra, on the south east Queensland coast. The data was recorded by volunteer observers during the period January 1979 to June 1990. The Beach Protection Authority wishes to thank all observers who were involved in the recording of data at the C.O.P.E. Station, with particular thanks to Mr F.W. Huxham. The information published is considered representative of the long term conditions. At date of publication, the station was still active. A break in daily recording occurred between January 1982 to July 1985.

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- Rainbow Beach — Widgee Shire, (Report C25.1).
- Hull Heads — Cardwell Shire, (Report 26.1).
- Trinity Beach — Mulgrave Shire, (Report 27.1).

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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 C.O.P.E. 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 daily for at least a three year period.

1.2 Site selection

In selecting a site for a C.O.P.E. 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 C.O.P.E. data with planned or existing data collection programmes.

1.3 Instrumentation

The C.O.P.E. observers are supplied with a basic kit of recording instruments including:

- 30 metre tape, wind meter, stop watch, 2.0 metre measuring sticks, recording forms and fluorescent dye.

A graduated reference pole is usually 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 C.O.P.E. observers are volunteers, who may be local business people, local residents or school children. Some stations are operated by Government and Local Authority 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 C.O.P.E. programme. Wave parameters such as type, height, and angle of approach together with surf zone width and the location of vegetation line all require visual assessment. The accuracy will vary from observer to observer and possibly from recording to recording of this assessment. 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 C.O.P.E. stations by the Authority's C.O.P.E. 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 C.O.P.E. 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 C.O.P.E. data for the eleven year period 1979 to 1990 in a useful statistical form. No attempt has been made to interpret the observed data.

If the eleven year period is representative of the long term average meteorological conditions, the statistics presented on wind, wave and beach movements can be regarded as typical. However, this recording 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

Buddina Beach is located within the City of Caloundra and lies approximately 75 kilometres north of Brisbane on the south east Queensland coast. It is a 3 kilometre stretch of coastline, south of Point Cartwright. The location of the Buddina Beach C.O.P.E. station is shown in Figures 1.1 and 1.2.

2.2 Observers

This station has been operated by local resident Mr. F.W. Huxham (1979-1990). Mr Huxham has been assisted during various periods by Mr G. Jenkins (deceased), Mr S. Marriage and Mr M. Greatrex. Due to the dedication of the volunteer observers, Mr Huxham in particular, an excellent long term data set has been assembled with a very high rate of data captured.

2.3 Observed parameters

The observers at this station recorded the majority of observations in the morning.

This station has recorded:

- Wave Period
- Wave Height
- Wave Direction
- Wave Type
- Surf Zone Width
- Presence of Offshore Bar
- Wind Speed
- Wind Direction
- State of Tide
- Distance to Berm
- Berm Elevation
- Distance to Vegetation Line
- Sand Level at C.O.P.E. Reference Pole
- Foreshore Slope
- Longshore Current Speed
- Longshore Current Direction
- Distance from Shoreline to Dye Patch/Float
(Recorded from March 1986)

In addition a sand sample was collected at the station each month, and since March 1979, a profile of the beach has usually been recorded monthly.

2.4 Tidal information

Tidal information for Mooloolaba is presented below. Datum is Lowest Astronomical Tide (L.A.T.)

M.H.W.S.	1.60 metres
M.H.W.N.	1.28 metres
M.S.L.	0.96 metres
M.L.W.N.	0.56 metres
M.L.W.S.	0.24 metres

A.H.D. is 0.99 metres above Lowest Astronomical Tide.

Tidal information was obtained from the 1993 Queensland Tide Tables.

2.5 Description of the beach

The beach at the Buddina Beach C.O.P.E. Station exhibits the following characteristics:

- Typical beach slopes: Foreshore slope is in the range 1 in 6 to 1 in 15 (10° - 4°).
- Beach width: Varied from 30 to 80 metres measured from the seaward toe of the frontal dune to Low Water Mark over the eleven year period (1979-1990).
- D50 sand size: 0.46 mm averaged over eleven years (1979-1990).
- Adjoining landform: Broad low frontal dune system backing onto a higher main dune on which development has occurred. The seaward face of the main dune is steep due to scarping caused by erosion.
- Vegetation: Sand spinifex grass *Spinifex sericeus* open grassland on the frontal dune system with horsetail she-oak *Casuarina equisetifolia* var. *incana* and screw pine *Pandanus tectorius* var. *pendunculatus* occurring on the crest of the main dune.

2.6 Meteorological events

The following cyclones were recorded by the Brisbane Bureau of Meteorology as having tracks within 500 kilometres of Buddina Beach between January 1979 and June 1990. It is considered that these meteorological events may have had some effect on the condition of Buddina Beach.

Cyclone Paul	03/01/80 - 08/01/80
Cyclone Simon	20/02/80 - 28/02/80
Cyclone Cliff	09/02/81 - 15/02/81
Cyclone Abigail	22/01/82 - 05/02/82
Low Pressure System	03/06/83 - 06/06/83
Cyclone Ingrid	20/02/84 - 25/02/84
Cyclone Lance	04/04/84 - 07/04/84
Low Pressure System	07/04/84 - 13/04/84
Low Pressure System	18/05/84 - 23/05/84
Cyclone Pierre	18/02/85 - 24/02/85
Cyclone Vernon	21/01/86 - 24/01/86
Cyclone Nancy	28/01/89 - 04/02/89
Cyclone Hilda	04/03/89 - 08/03/89

2.7 Supervision of station

The observers were instructed in the recording programme by the C.O.P.E. 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 of the reference pole for this station has been carried out by the Landsborough Shire Council (now Caloundra City Council) and the Authority wishes to thank the Council for its assistance in all matters associated with the C.O.P.E. project. Maintenance of the pole has been carried out by the Authority's C.O.P.E. Field Officer.

3.0 Data

3.1 General

C.O.P.E. data for this station for the eleven year period January 1979 to June 1990 is presented on the attached figures. The data has 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. Prior to March 1986 wind direction was estimated to the nearest compass sector. After this time wind direction is recorded in degrees by compass.

A summary of annual wind speed and direction percentage occurrences are shown as a wind rose in Figure 3. Where applicable, morning and afternoon readings as well as the overall average are shown.

Wind speed was recorded in miles per hour (m.p.h.) rather than knots after February 1986. The recordings are converted from (m.p.h.) to knots for Figure 3.

3.3 Waves

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

Recordings of maximum wave height and method used to obtain wave height were introduced into the programme from March 1986. Wave type and state of tide were discontinued at this time.

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

Wave direction was recorded as a compass bearing from March 1986. The direction recorded was then converted to a sector (see the following paragraph regarding the sector system).

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 C.O.P.E. station this direction is approximately 10° west 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 4).
- (b) the percentage occurrence of various combinations of wave heights and periods and directions (Figure 5 and Figure 6).

(c) surf zone width with an indication of the existence or otherwise of an offshore bar (Figure 7 to Figure 15).

(d) tabulation of the occurrence of various wave heights, periods, types and directions (Tables 1 to 9).

- Elevation of the berm.
- Distance from reference pole to the vegetation line.
- The foreshore slope.

3.4 Longshore currents

The observer measured the distance parallel to the shoreline that a float or 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 16 to Figure 24). Mean upcoast and downcoast components and the overall annual means are also presented.

3.5 Beach profile parameters

Beach profile parameters were measured until 1981 using an Abney level, tape measure and reference pole. These include:

- Distance from reference pole to the berm.

Since 1985 profiles have been recorded using a measuring stick, the reference pole, and a line of sight to the horizon.

Sand level at the reference pole was formally recorded from March 1986 and the measurement of foreshore slope was discontinued at this time.

Changes in these parameters with time indicate how the beach moves in response to varying wave attack. Plots of these parameters are shown in Figure 25 to Figure 34.

Figure 35 shows a summary of monthly averages of distance to berm and distance to vegetation line for the full recording period.

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 Figure 36 to Figure 44.

Table 1.
Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Buddina Beach • No. of Observations: 364 • Year 1979

Month	Non-CALM obs	Mean wave period (secs)	No. obs	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs	SP	PL	Surge	SP/PL	CALM	No. obs	1	2	3	4	5	CALM
Jan.	31	8.4	31	1.32	31	51.6	6.5	-	41.9	-	31	-	16.1	83.9	-	-	-
Feb.	28	8.0	28	1.16	28	60.7	10.7	-	28.6	-	28	-	14.3	75.0	10.7	-	-
March	31	7.3	31	0.70	31	64.5	3.2	16.2	16.1	-	31	-	9.6	45.2	45.2	-	-
April	30	8.7	30	0.65	30	76.7	20.0	3.3	-	-	30	-	16.7	76.7	6.6	-	-
May	31	9.2	31	0.60	31	58.1	12.9	-	29.0	-	31	-	-	71.0	29.0	-	-
June	30	7.6	30	0.72	30	43.3	6.7	3.3	46.7	-	30	-	6.7	60.0	33.3	-	-
July	31	9.0	31	0.71	31	67.7	6.5	-	25.8	-	31	-	9.7	45.2	45.1	-	-
August	31	8.7	31	0.52	31	51.6	12.9	25.8	9.7	-	31	-	16.1	61.3	22.6	-	-
Sept.	30	7.2	30	0.57	30	56.7	6.7	30.0	6.6	-	30	-	30.0	36.7	33.3	-	-
Oct.	31	7.4	31	0.63	31	61.3	6.5	19.4	12.8	-	31	-	35.5	48.4	16.1	-	-
Nov.	30	7.6	30	0.64	30	79.7	-	10.3	10.0	-	30	-	56.7	30.0	13.3	-	-
Dec.	30	7.5	31	0.76	31	38.7	-	41.9	19.4	-	30	-	43.3	46.7	10.0	-	-
Whole year	365	8.0	365	0.75	365	58.9	7.7	12.9	20.5	0.0	364	0.0	21.1	56.6	22.3	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.
 Buddina Beach • No. of Observations: 365 • Year 1980

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	31	7.2	31	0.73	31	9.6	6.5	58.1	25.8	-	30	-	30.0	56.7	13.3	-	-
Feb.	29	8.3	29	1.18	29	10.4	10.3	41.4	37.9	-	29	-	6.9	44.8	48.3	-	-
March	31	8.2	31	0.97	31	25.8	3.2	54.9	16.1	-	30	-	30.0	53.3	16.7	-	-
April	30	8.0	30	1.08	30	43.3	-	43.4	13.3	-	30	-	13.3	60.0	26.7	-	-
May	31	8.2	31	1.12	31	22.6	12.9	54.8	9.7	-	31	-	12.9	48.4	38.7	-	-
June	28	8.7	29	0.63	29	31.0	-	65.6	3.4	-	29	-	13.8	34.5	51.7	-	-
July	30	8.8	31	0.64	31	64.5	-	19.4	16.1	-	30	-	6.7	40.0	53.3	-	-
August	31	7.9	31	0.71	31	87.1	-	-	12.9	-	31	-	19.4	54.8	25.8	-	-
Sept.	30	6.8	30	0.51	30	83.3	-	10.0	6.7	-	30	-	56.7	23.3	20.0	-	-
Oct.	31	7.7	31	0.73	31	67.7	6.5	16.1	9.7	-	31	-	35.5	48.4	16.1	-	-
Nov.	30	6.9	30	0.64	30	86.7	-	13.3	-	-	29	-	58.6	20.7	20.7	-	-
Dec.	31	6.8	31	0.79	31	41.9	-	25.8	32.3	-	31	-	41.9	50.0	16.1	-	-
Whole year	365	7.8	365	0.81	365	47.9	3.3	33.5	15.3	0.0	361	0.0	27.2	44.0	28.8	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.
 Buddina Beach • No. of Observations: 365 • Year 1981

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	31	8.1	31	1.04	31	32.3	3.2	51.6	12.9	-	30	-	6.6	76.7	16.7	-	-
Feb.	28	8.5	28	1.07	28	39.3	17.9	35.7	7.1	-	28	-	14.3	50.0	35.7	-	-
March	31	8.2	31	1.18	31	41.9	9.7	-	48.4	-	31	-	9.7	90.3	-	-	-
April	30	8.3	30	1.02	30	63.3	16.7	-	20.0	-	30	-	-	100.0	-	-	-
May	31	9.0	31	1.15	31	25.8	-	38.7	35.5	-	31	-	16.1	38.7	38.7	6.5	-
June	30	8.9	30	0.65	30	23.3	3.3	66.7	6.7	-	25	-	28.0	12.0	32.0	28.0	-
July	31	9.0	31	0.85	31	51.6	3.2	22.6	22.6	-	31	-	29.0	32.3	38.7	-	-
August	31	8.6	31	0.78	31	41.9	3.2	19.4	35.5	-	31	3.2	25.8	25.8	38.7	6.5	-
Sept.	30	7.8	30	0.90	30	53.3	-	10.0	36.7	-	30	13.4	33.3	16.7	23.3	13.3	-
Oct.	31	7.9	31	1.03	30	56.6	-	6.7	36.7	-	31	6.4	45.2	25.6	12.9	9.7	-
Nov.	30	7.9	30	1.10	30	43.3	3.4	33.3	20.0	-	30	16.7	33.3	16.7	23.3	10.0	-
Dec.	31	8.4	31	1.08	31	51.6	3.2	9.7	35.5	-	31	9.7	58.1	16.1	3.2	12.9	-
Whole year	365	8.4	365	0.99	364	43.7	5.2	24.5	26.6	0.0	359	4.1	25.1	42.0	21.7	7.0	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.
Buddina Beach • No. of Observations: 158 • Year 1985

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
July	6	9.2	6	0.72	6	83.3	-	16.7	-	-	6	-	16.7	33.3	33.3	16.7	-
August	31	8.5	31	0.66	30	76.7	-	3.3	20.0	-	31	-	51.6	12.9	35.5	-	-
Sept.	30	10.2	30	0.75	30	66.7	-	-	33.3	-	30	3.3	46.7	13.3	30.0	6.7	-
Oct.	31	8.8	31	0.90	31	61.3	6.5	-	32.2	-	31	-	64.5	12.9	19.4	3.2	-
Nov.	30	9.1	30	0.98	30	63.3	6.7	-	30.0	-	30	-	43.4	30.0	3.3	23.3	-
Dec.	30	8.7	30	0.98	30	83.3	6.7	-	10.0	-	30	10.0	63.4	13.3	3.3	10.0	-
Whole year	158	9.1	158	0.85	157	70.7	3.8	1.3	24.2	0.0	158	2.5	52.5	17.1	19.0	8.9	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 occurrences.
Buddina Beach • No. of Observations: 364 • Year 1986

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	31	9.3	31	1.40	31	35.5	35.5	29.0	-	-	31	-	29.0	25.8	45.2	-	-
Feb.	28	8.6	28	1.09	28	71.4	10.7	3.6	14.3	-	28	-	64.3	7.1	21.4	7.2	-
March	31	8.6	31	1.25	7	42.9	-	-	57.1	-	31	6.5	16.1	32.2	19.4	25.8	-
April	30	8.4	30	1.34	0	CR	CR	CR	CR	-	30	-	6.7	16.7	53.3	23.3	-
May	31	8.8	31	0.93	0	-	-	-	-	-	31	-	3.2	19.4	51.6	25.8	-
June	30	8.9	30	1.05	0	-	-	-	-	-	30	-	-	18.7	33.3	50.0	-
July	31	8.9	31	0.98	0	-	-	-	-	-	31	3.2	16.1	12.9	45.2	22.6	-
August	31	9.1	31	0.85	0	-	-	-	-	-	30	3.3	-	16.7	53.3	26.7	-
Sept.	30	7.4	30	0.75	0	-	-	-	-	-	30	10.0	16.7	23.3	30.0	20.0	-
Oct.	31	7.1	31	0.56	0	-	-	-	-	-	31	19.4	19.4	19.4	35.4	6.4	-
Nov.	30	7.3	30	0.85	0	-	-	-	-	-	30	3.3	6.7	16.7	46.7	26.6	-
Dec.	30	8.1	30	1.01	0	-	-	-	-	-	30	-	33.3	23.3	26.7	16.7	-
Whole year	364	8.4	364	1.00	66	51.5	21.2	15.2	12.1	0.0	363	3.9	17.4	19.3	38.6	20.8	0.0

SP - Spilling
PL - Plunging
SP/PL - Combined spilling and plunging
CR - Ceased recording wave type

Table 6.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
 Buddina Beach • No. of Observations: 355 • Year 1987

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction						
					No. obs.	1	2	3	4	5	CALM
Jan.	27	7.7	27	0.77	27	-	29.6	44.4	18.6	7.4	-
Feb.	24	7.9	24	0.99	24	-	8.3	37.6	45.8	8.3	-
March	31	7.3	31	0.74	31	3.2	16.1	16.1	32.3	32.3	-
April	30	8.0	30	1.31	30	3.3	-	13.4	53.3	30.0	-
May	31	8.4	31	1.06	31	-	3.2	16.1	58.1	22.6	-
June	29	8.4	29	1.01	29	-	-	24.2	37.9	37.9	-
July	30	9.5	30	1.12	30	-	6.7	13.3	70.0	10.0	-
August	31	8.6	31	1.00	31	-	-	41.9	38.7	19.4	-
Sept.	30	7.4	30	0.59	30	6.7	3.3	23.3	36.7	30.0	-
Oct.	31	7.1	31	0.87	31	9.7	6.5	22.6	38.7	22.5	-
Nov.	30	7.3	30	0.79	29	10.3	3.4	24.2	48.3	13.8	-
Dec.	31	7.0	31	0.74	31	16.1	32.3	29.0	19.4	3.2	-
Whole year	355	7.9	355	0.91	354	4.2	9.0	25.1	41.5	20.1	0.0

Table 7.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
 Buddina Beach • No. of Observations: 360 • Year 1988

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction						
					No. obs.	1	2	3	4	5	CALM
Jan.	31	7.9	31	1.46	31	-	16.0	19.4	58.1	6.5	-
Feb.	29	7.3	29	0.93	29	-	6.9	20.7	44.8	27.6	-
March	31	8.7	31	1.51	31	-	3.2	6.5	48.4	41.9	-
April	30	9.0	30	1.53	30	-	10.0	10.0	53.3	26.7	-
May	29	9.0	29	0.91	29	-	3.4	-	65.6	31.0	-
June	29	8.8	29	1.27	29	3.4	-	31.0	37.9	27.7	-
July	31	7.9	31	1.01	30	6.7	6.7	23.3	40.0	23.3	-
August	30	7.5	30	0.71	30	3.3	10.0	10.0	46.7	30.0	-
Sept.	29	7.5	29	0.85	29	6.9	17.2	10.3	48.4	17.2	-
Oct.	31	8.3	31	0.64	31	8.5	35.5	9.7	29.0	19.3	-
Nov.	29	7.6	29	1.38	29	-	24.1	17.2	41.4	17.3	-
Dec.	31	8.3	31	1.52	31	-	19.4	9.7	61.2	9.7	-
Whole year	360	8.0	360	1.15	359	2.2	12.8	13.9	47.9	23.2	0.0

Table 8.

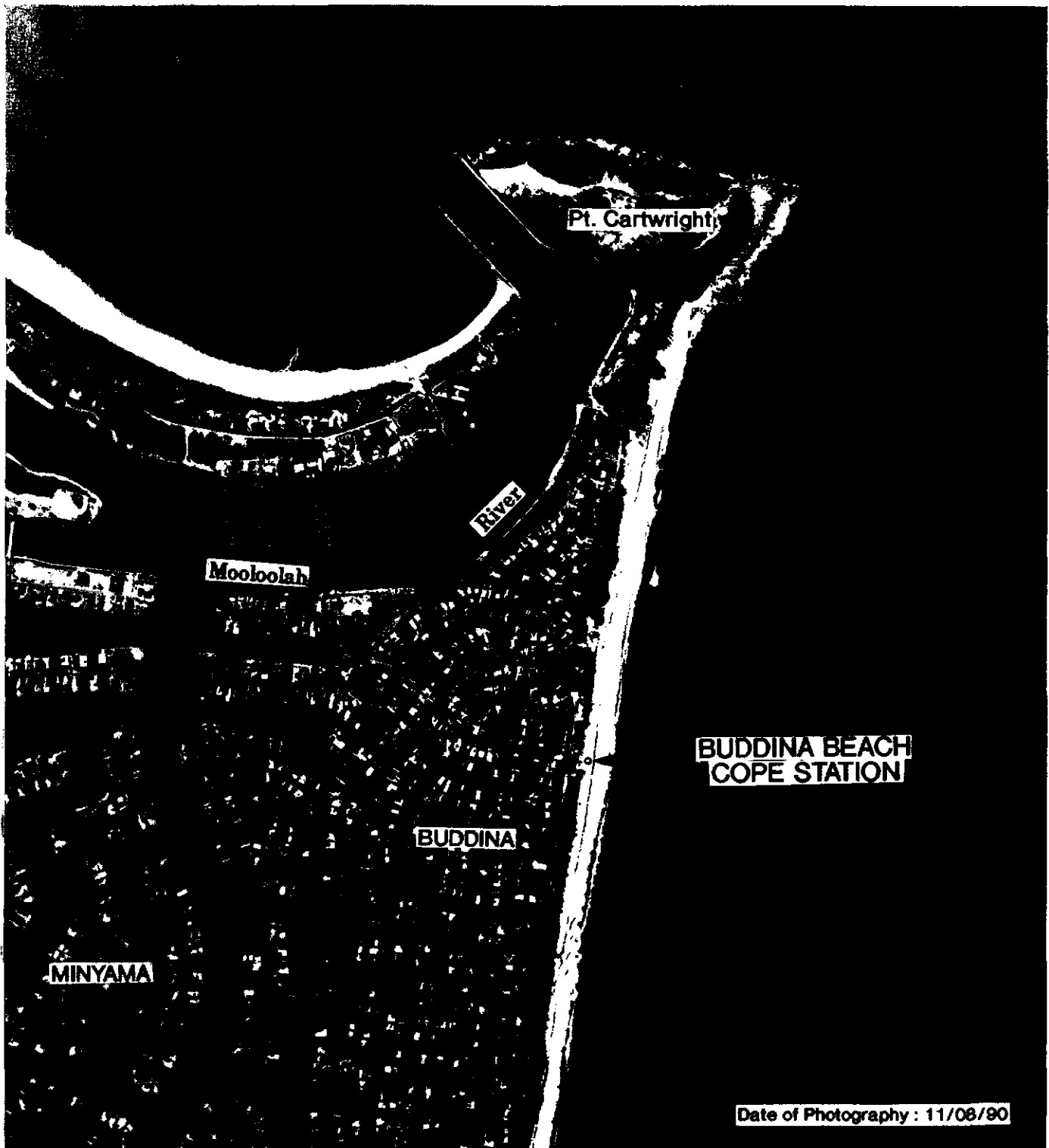
Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
 Buddina Beach • No. of Observations: 345 • Year 1989

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction						
					No. obs.	1	2	3	4	5	CALM
Jan.	31	8.7	31	1.29	31	-	3.2	12.9	54.9	29.0	-
Feb.	27	8.3	27	1.71	27	-	-	18.5	48.1	33.4	-
March	29	8.0	29	1.10	27	3.7	7.4	29.6	44.4	14.9	-
April	27	8.7	27	1.39	27	-	-	33.3	66.7	-	-
May	22	9.9	22	1.69	22	-	-	50.0	45.5	4.5	-
June	33	7.7	35	0.69	35	-	-	8.6	45.7	45.7	-
July	29	8.1	29	0.57	29	3.4	3.4	10.3	41.4	41.5	-
August	30	9.3	30	1.11	30	-	13.3	6.7	53.3	26.7	-
Sept.	28	7.3	28	0.71	27	16.5	14.8	3.7	33.3	29.7	-
Oct.	28	6.7	28	0.66	28	21.4	28.6	10.7	14.3	25.0	-
Nov.	29	8.2	29	1.01	29	3.4	13.8	20.7	34.5	27.6	-
Dec.	30	7.9	30	1.37	30	6.7	16.7	13.3	40.0	23.3	-
Whole year	345	8.2	345	1.11	342	4.7	8.5	17.3	43.5	26.0	0.0

Table 9.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
 Buddina Beach • No. of Observations: 172 • Year 1990

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction						
					No. obs.	1	2	3	4	5	CALM
Jan.	30	7.7	30	1.12	30	-	20.0	23.4	43.3	13.3	-
Feb.	27	8.9	27	1.49	27	-	7.4	22.2	66.7	3.7	-
March	29	8.1	29	1.61	29	-	3.5	3.4	62.1	31.0	-
April	28	8.3	28	1.01	28	7.1	3.6	21.4	53.6	14.3	-
May	29	7.9	29	0.85	29	-	10.3	3.4	55.2	31.0	-
June	29	9.0	29	1.55	29	-	3.5	17.2	41.4	37.9	-
July	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-
Sept.	-	-	-	-	-	-	-	-	-	-	-
Oct.	-	-	-	-	-	-	-	-	-	-	-
Nov.	-	-	-	-	-	-	-	-	-	-	-
Dec.	-	-	-	-	-	-	-	-	-	-	-
Whole year	172	8.3	172	1.27	172	1.2	8.1	15.1	53.5	22.1	0.0



100 0 100 200 300 400 500 metres
Scale 1:12 000 approx.



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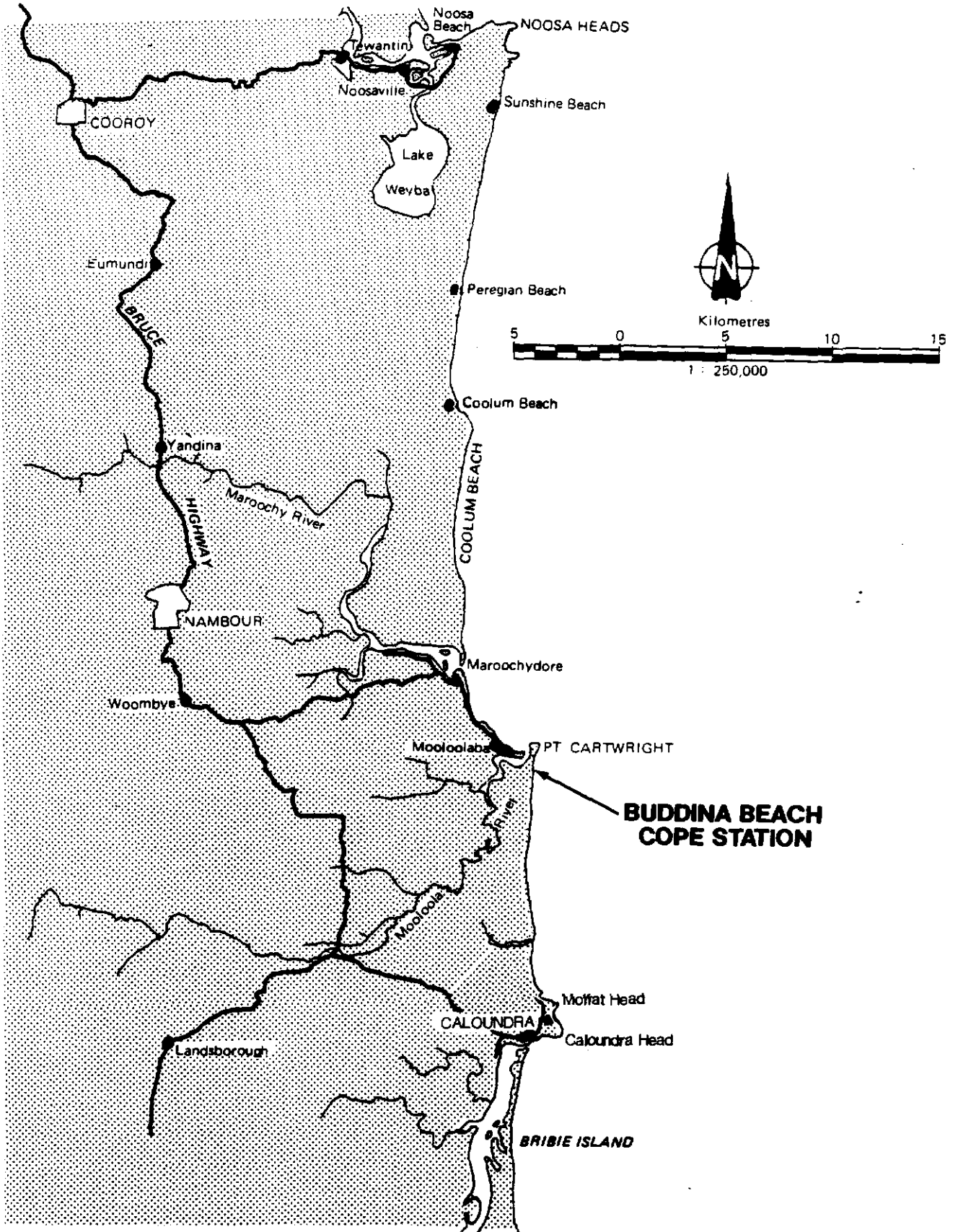
SITE PLAN

COPE
Buddina Beach

Figure

1.1

C 28.1



**BUDDINA BEACH
COPE STATION**



Beach Protection Authority
Queensland

LOCALITY PLAN

COPE
Buddina Beach
Figure
1.2
C 28.1



BEACH PROTECTION AUTHORITY OF QUEENSLAND

Form No. BE 4F

COASTAL OBSERVATION PROGRAMME - ENGINEERING

COPE

RECORD ALL DATA CAREFULLY AND LEGIBLY

<u>SITE NUMBER</u> 1 2 3 4 5 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<u>DAY</u> 6 7 <input type="text"/> <input type="text"/>	<u>MONTH</u> 8 9 <input type="text"/> <input type="text"/>	<u>YEAR</u> 10 11 <input type="text"/> <input type="text"/>	<u>TIME</u> <input type="checkbox"/> Summer Time or <input type="checkbox"/> Standard Time	Record time using 24 hour system 12 13 14 15 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
(i) <u>WAVE HEIGHT (AVERAGE)</u> Record the best estimate of the average breaking wave height to the nearest tenth of a metre. If less than 0.1 record as 0.0 and go directly to Section (ii). 16 <input type="text"/> 17 <input type="text"/>			<u>WAVE HEIGHT (MAXIMUM)</u> Record the best estimate of the maximum breaking wave height during the entire observation period to the nearest tenth of a metre. 18 <input type="text"/> 19 <input type="text"/>		
<u>WAVE HEIGHT METHOD</u> Record the method that you used to obtain wave height. Record 1 if visual estimate Record 2 if measured with COPE sticks Record 3 if measured by COPE pole 20 <input type="text"/>			<u>WAVE PERIOD</u> Record the time in seconds for eleven (11) wave crests to pass a stationary point just seaward of the surf zone. 21 <input type="text"/> 22 <input type="text"/> 23 <input type="text"/>		
<u>WAVE DIRECTION</u> Determine the direction that the waves are entering the surf zone using the compass provided and record the direction in degrees. 24 <input type="text"/> 25 <input type="text"/> 26 <input type="text"/>			<u>SURF ZONE WIDTH</u> Record the time in seconds for a wave of average height to traverse the surf zone from break point to final run-up on the beach. 27 <input type="text"/> 28 <input type="text"/> 29 <input type="text"/>		
(ii) <u>CURRENT SPEED</u> Measure in metres the distance that the centre of the dye patch is observed to move during a one (1) minute period; if no long shore movement record 000. 30 <input type="text"/> 31 <input type="text"/> 32 <input type="text"/>			<u>CURRENT DIRECTION</u> When the observer faces the sea 0 — no long shore movement L — dye moves to the left R — dye moves to the right 33 <input type="text"/>		
<u>DISTANCE FROM SHORE</u> Record the distance in metres from the shore to where the current measurements were commenced. 34 <input type="text"/> 35 <input type="text"/>			<u>OFFSHORE BAR</u> Is an off-shore bar causing the waves to break? 1—yes 0—no 36 <input type="text"/>		
(iii) <u>WIND SPEED</u> Record wind speed to the nearest m.p.h. If calm record 00 and go directly to Section (iv). 37 <input type="text"/> 38 <input type="text"/>			<u>WIND DIRECTION</u> Determine the direction that the wind is coming from using the compass provided and record the direction in degrees. 39 <input type="text"/> 40 <input type="text"/> 41 <input type="text"/>		
(iv) <u>BERM ELEVATION</u> Record the elevation of berm to the nearest tenth of a metre. Measurements should be taken of the most seaward berm if more than one exists. 42 <input type="text"/> 43 <input type="text"/>			<u>DISTANCE TO THE BERM</u> Record the distance, to the nearest metre, from the reference post to the berm. Distances landward of the reference post are negative. e.g. 009 measures 9 metres seaward (No sign); -07 measures 7 metres landward. (Minus sign). 44 <input type="text"/> 45 <input type="text"/> 46 <input type="text"/>		
(v) <u>DISTANCE TO THE VEGETATION</u> Record the distance from the reference post to the average vegetation line. Distances landward of the reference post are negative. 47 <input type="text"/> 48 <input type="text"/> 49 <input type="text"/>			<u>SAND LEVEL AT POLE</u> Record to nearest tenth of a metre. 50 <input type="text"/> 51 <input type="text"/>		
(vi) <u>SAND SAMPLE</u> If sample taken then record 1. Otherwise leave blank. 52 <input type="checkbox"/>		<u>PLEASE PRINT</u> Please check the form for completeness _____ SITE NAME OBSERVER _____ REMARKS: _____ _____ Make any additional remarks, computations or sketches on the reverse side of this form.			
(for office use only)					
53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80					
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>					



Beach Protection Authority
Queensland

OBSERVATION FORM

COPE
Buddina Beach
Figure
2.1
C 28.1

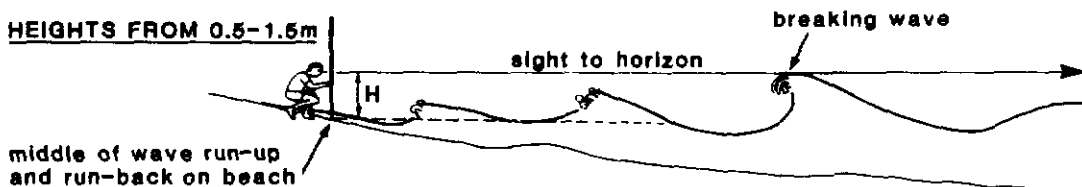
WAVE HEIGHT AND DIRECTION INSTRUCTIONS

METHOD 1 VISUAL ESTIMATION

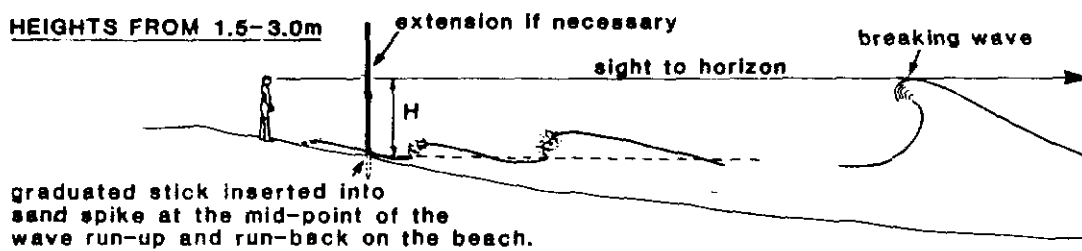
This method should only be used where the waveheights are below 0.5 and it is not practicable to use the preferred Method 2.

METHOD 2

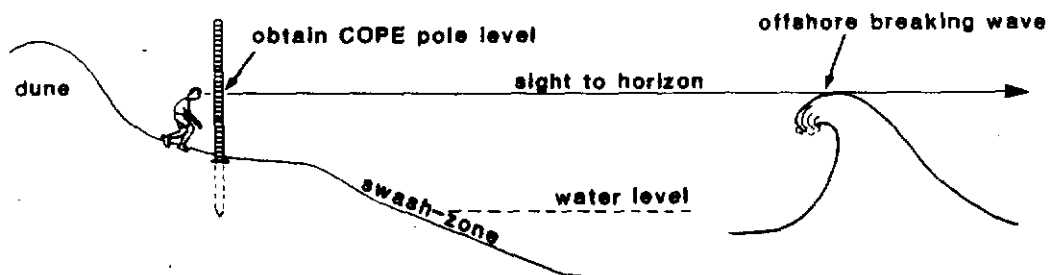
HEIGHTS FROM 0.5-1.5m



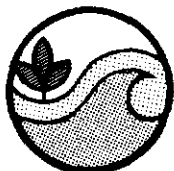
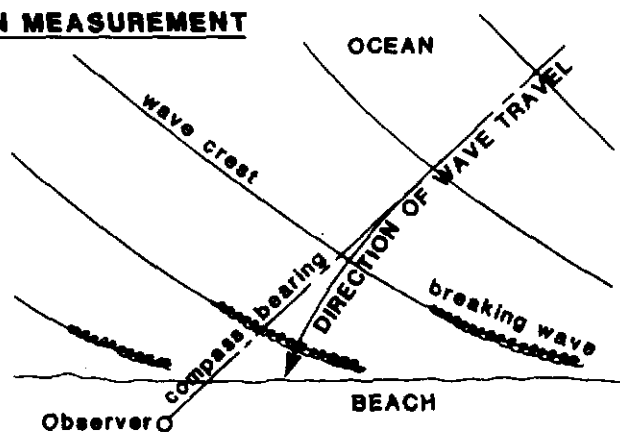
HEIGHTS FROM 1.5-3.0m



METHOD 3 FOR WAVES OVER 3m



WAVE DIRECTION MEASUREMENT

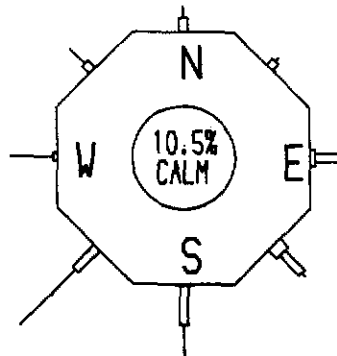


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METHODS FOR RECORDING WAVE PARAMETERS

COPE
Buddina Beach
Figure
2.2
C 28.1

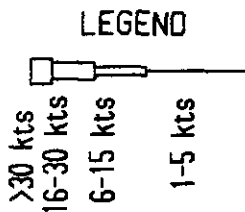
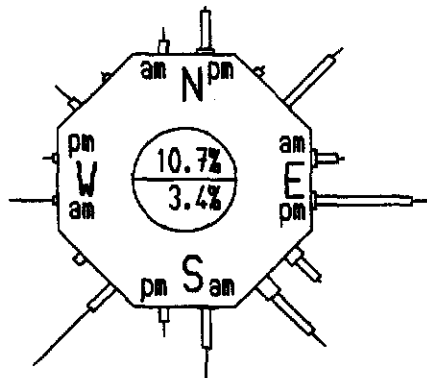
ALL OBSERVATIONS



Total No. of Observations : 2941

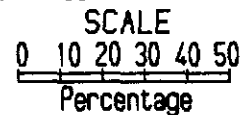
MORNING - AFTERNOON OBSERVATIONS

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



No. of Morning Observations : 2853
 No. of Afternoon Observations : 88

Mean Time :- Morning Obs : 0704 hrs
 Mean Time :- Afternoon Obs : 1535 hrs



WIND DATA - DEC 1978 to JUNE 1990



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 Queensland

WIND DATA

COPE
 Buddina Beach
 Figure
3
 C 28.1



WAVE HEIGHT PERCENTAGE EXCEEDANCE

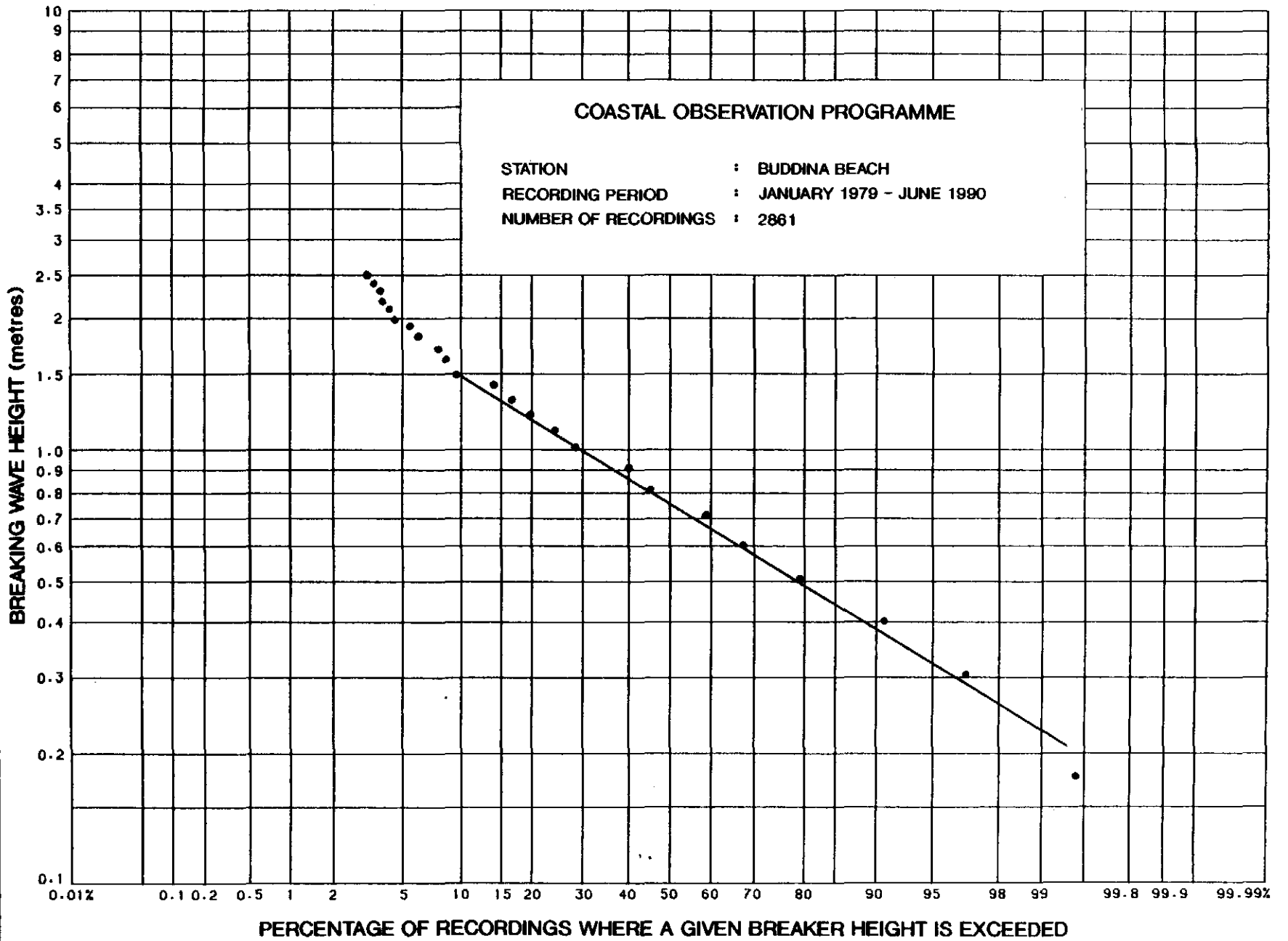
Buddina Beach

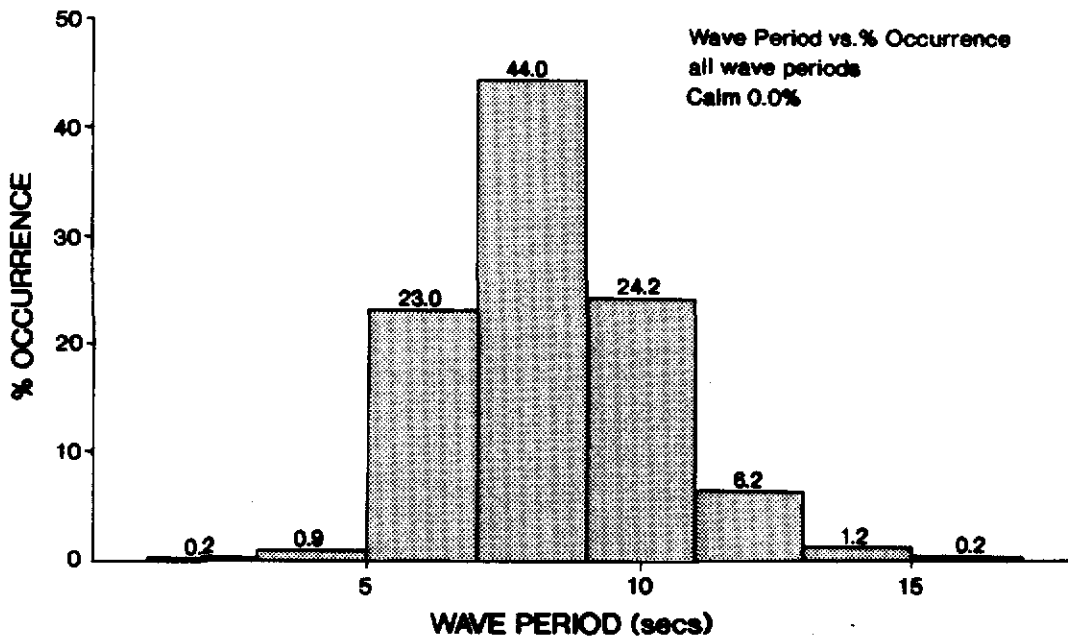
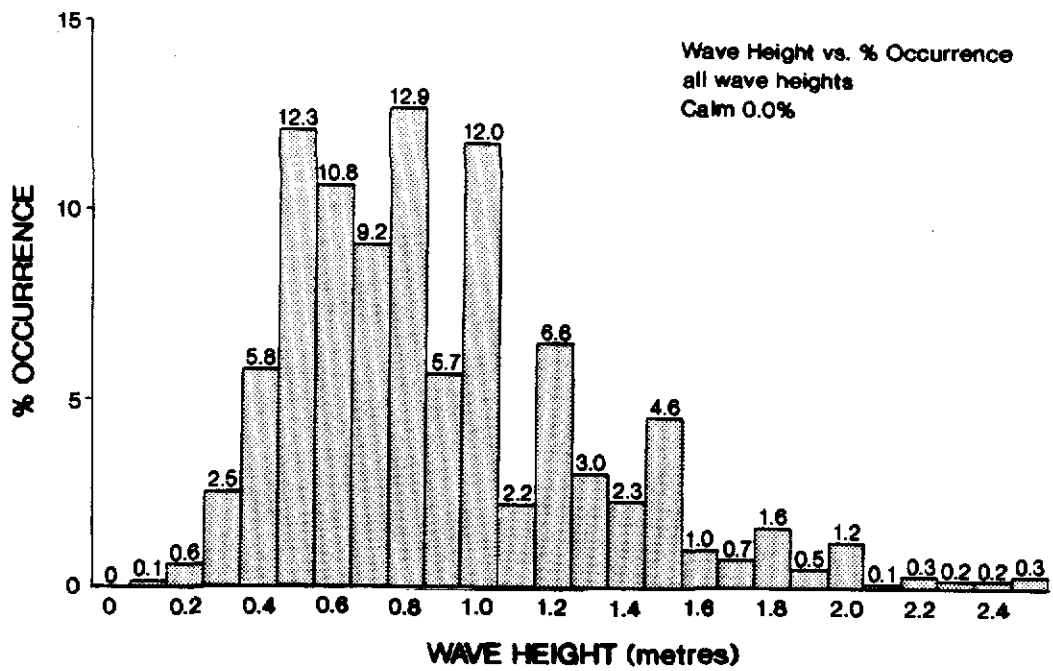
Figure

4

C 28.1

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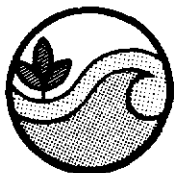
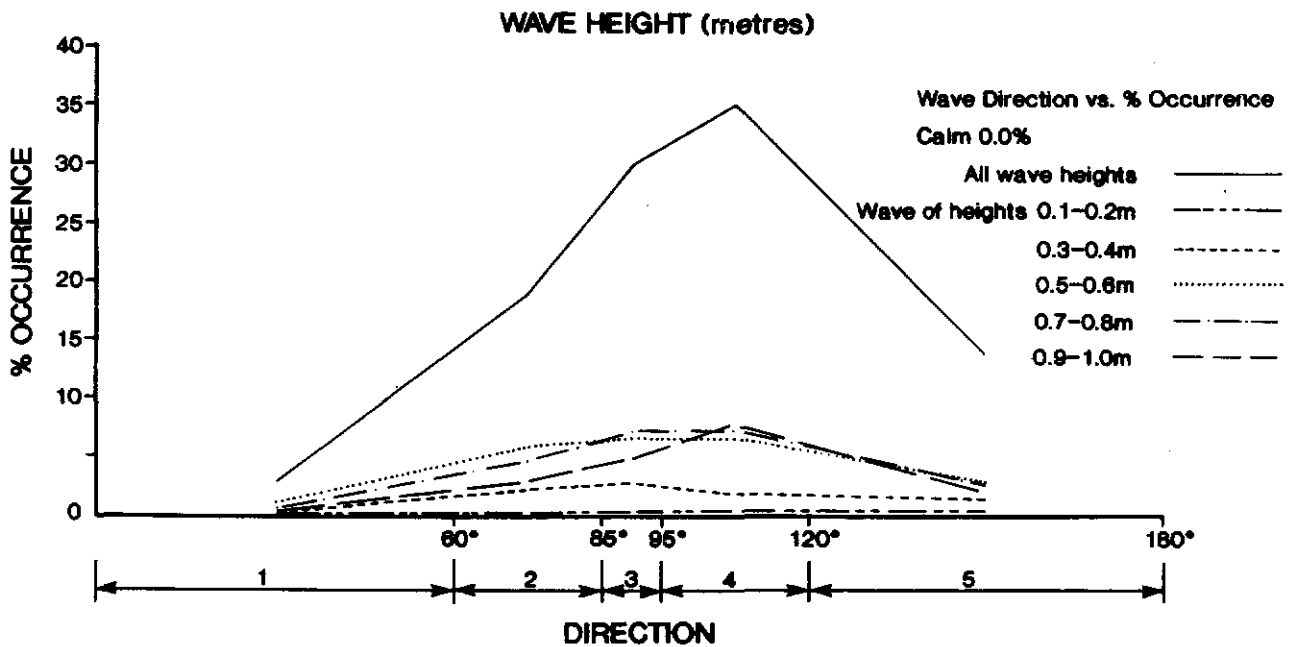
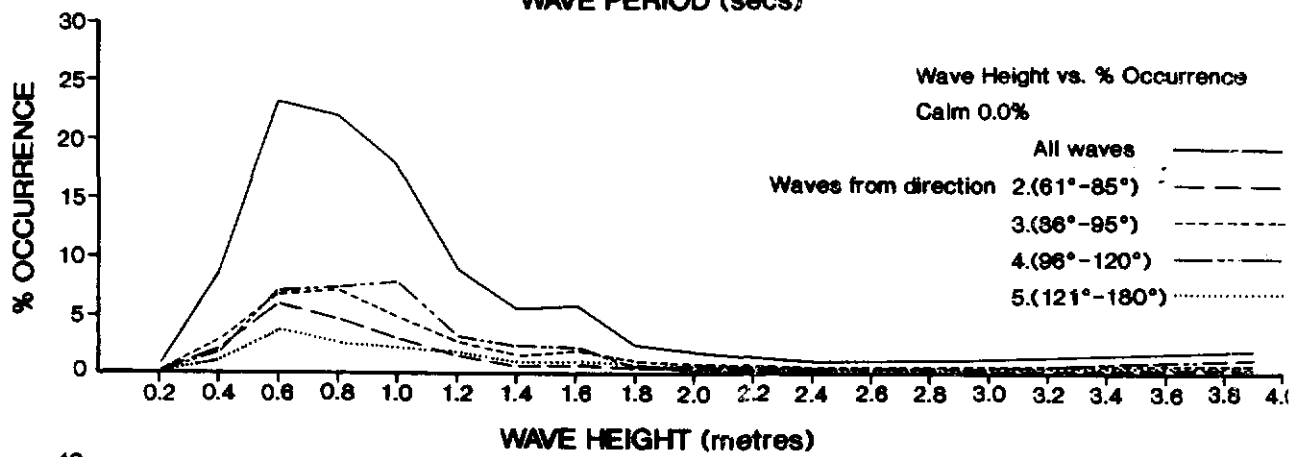
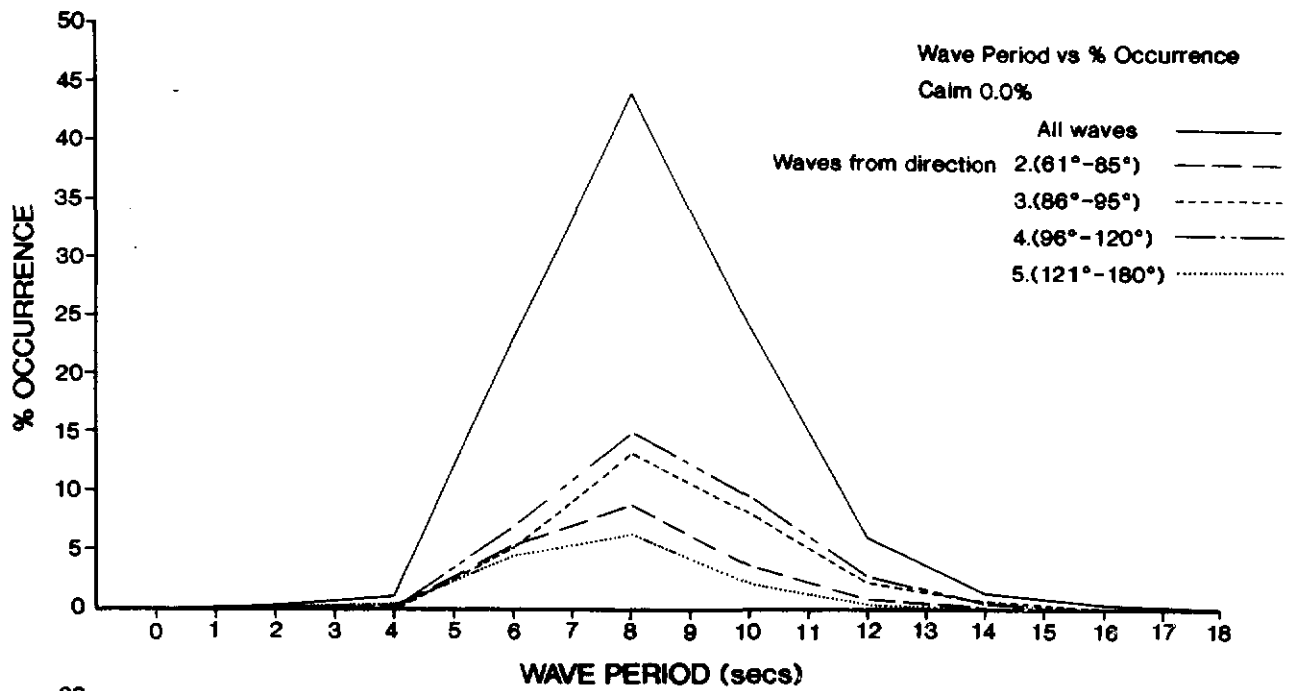
PERCENTAGE OCCURRENCE OF WAVE HEIGHT AND WAVE PERIOD

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Buddina Beach

Figure

5

C 28.1



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Queensland

WAVE DIRECTION ANALYSIS

COPE

Buddina Beach

Figure

6

C 28.1



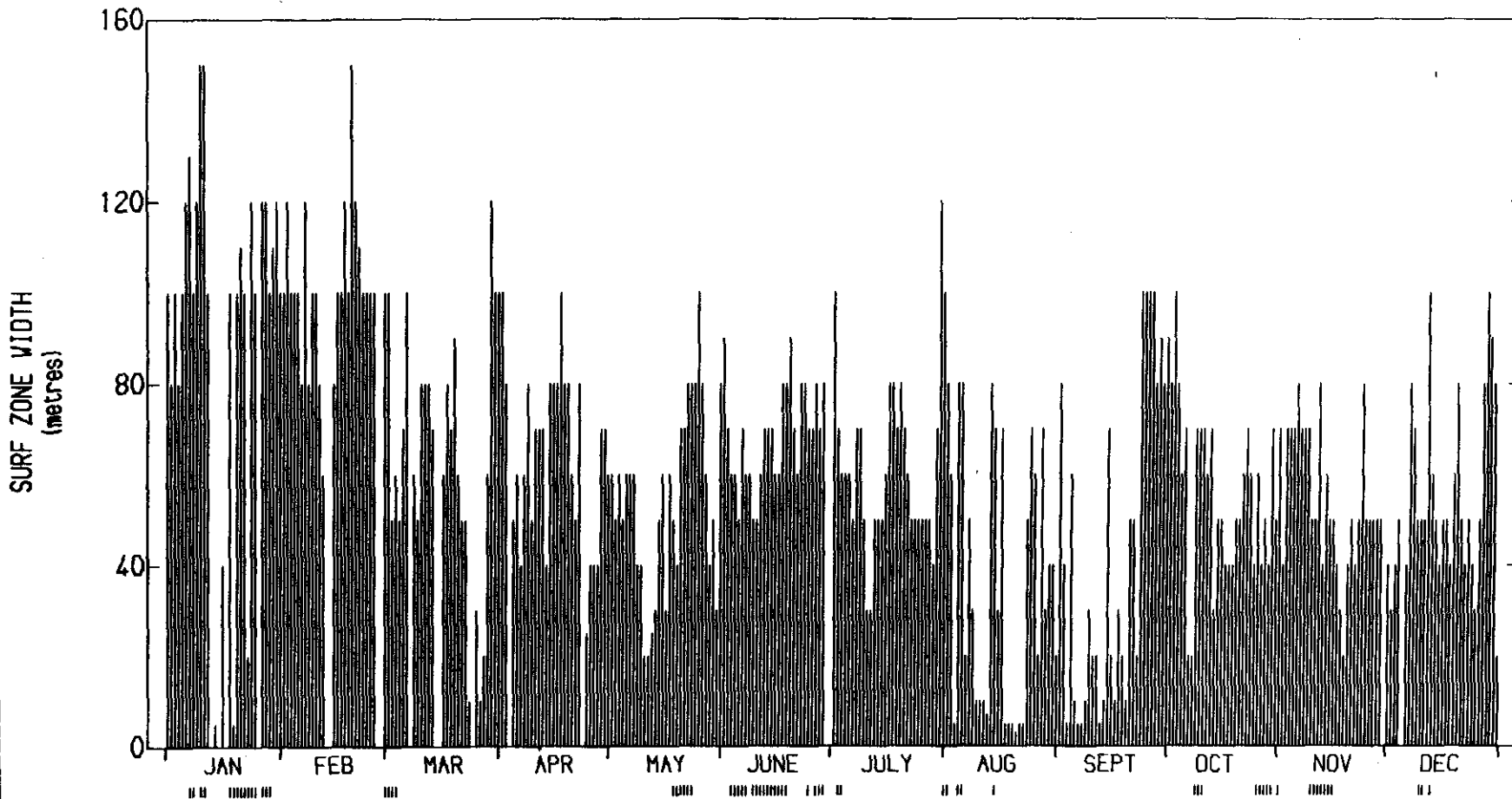
SURF ZONE WIDTH - MORNING 1979

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0603



SURF ZONE WIDTH SUMMARY - 1979

No. of Observations : 349

MORNING OBSERVATIONS

Mean Surf Zone Width = 62.3 m

||| Indicates Offshore Bar Present

COPE

Buddina Beach

Figure

7

C 28.1



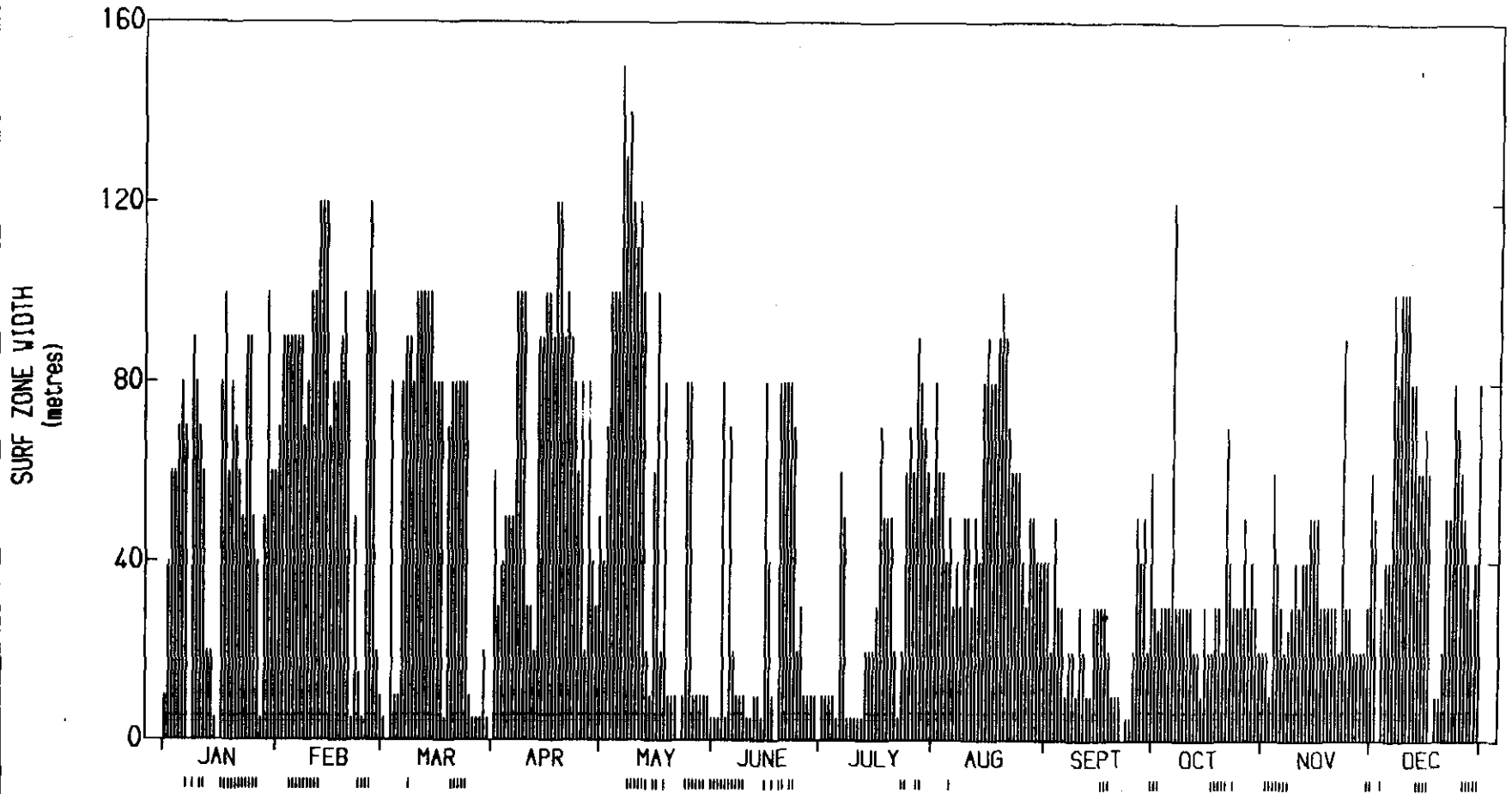
SURF ZONE WIDTH - MORNING 1980

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BUDDINA BEACH

0603



SURF ZONE WIDTH SUMMARY - 1980

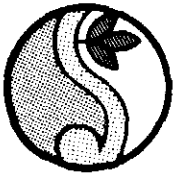
No. of Observations : 357

MORNING OBSERVATIONS

Mean Surf Zone Width = 49.8 m

w Indicates Offshore Bar Present

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Buddina Beach
Figure
8
C 28.1



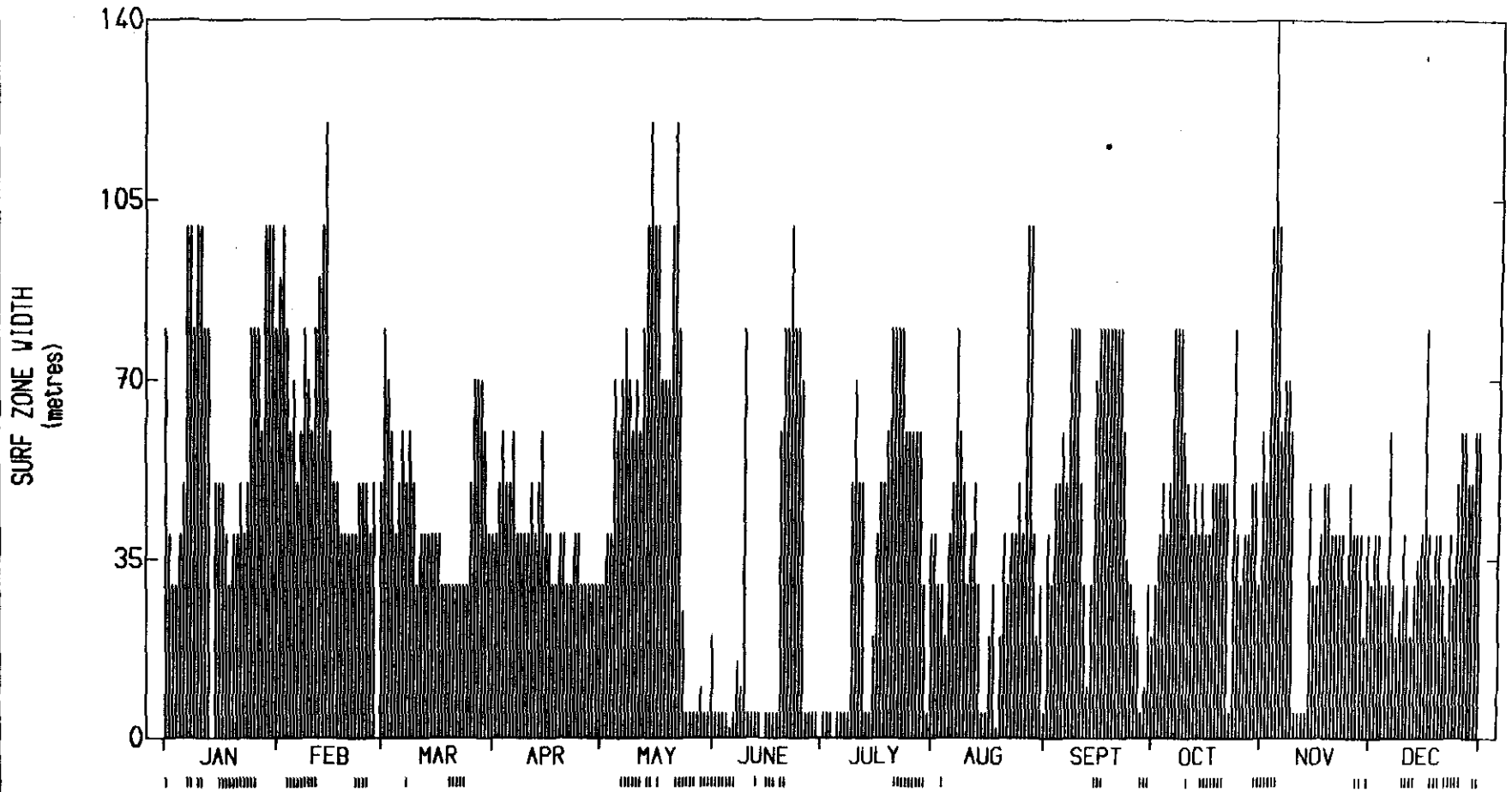
SURF ZONE WIDTH - MORNING 1981

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BUDDINA BEACH

0603



SURF ZONE WIDTH SUMMARY - 1981

No. of Observations : 362

MORNING OBSERVATIONS

Mean Surf Zone Width = 46.6 m

||| Indicates Offshore Bar Present

Buddina Beach
Figure
9
C 28.1

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SURF ZONE WIDTH - MORNING 1985

Buddina Beach

COPE

Figure

10

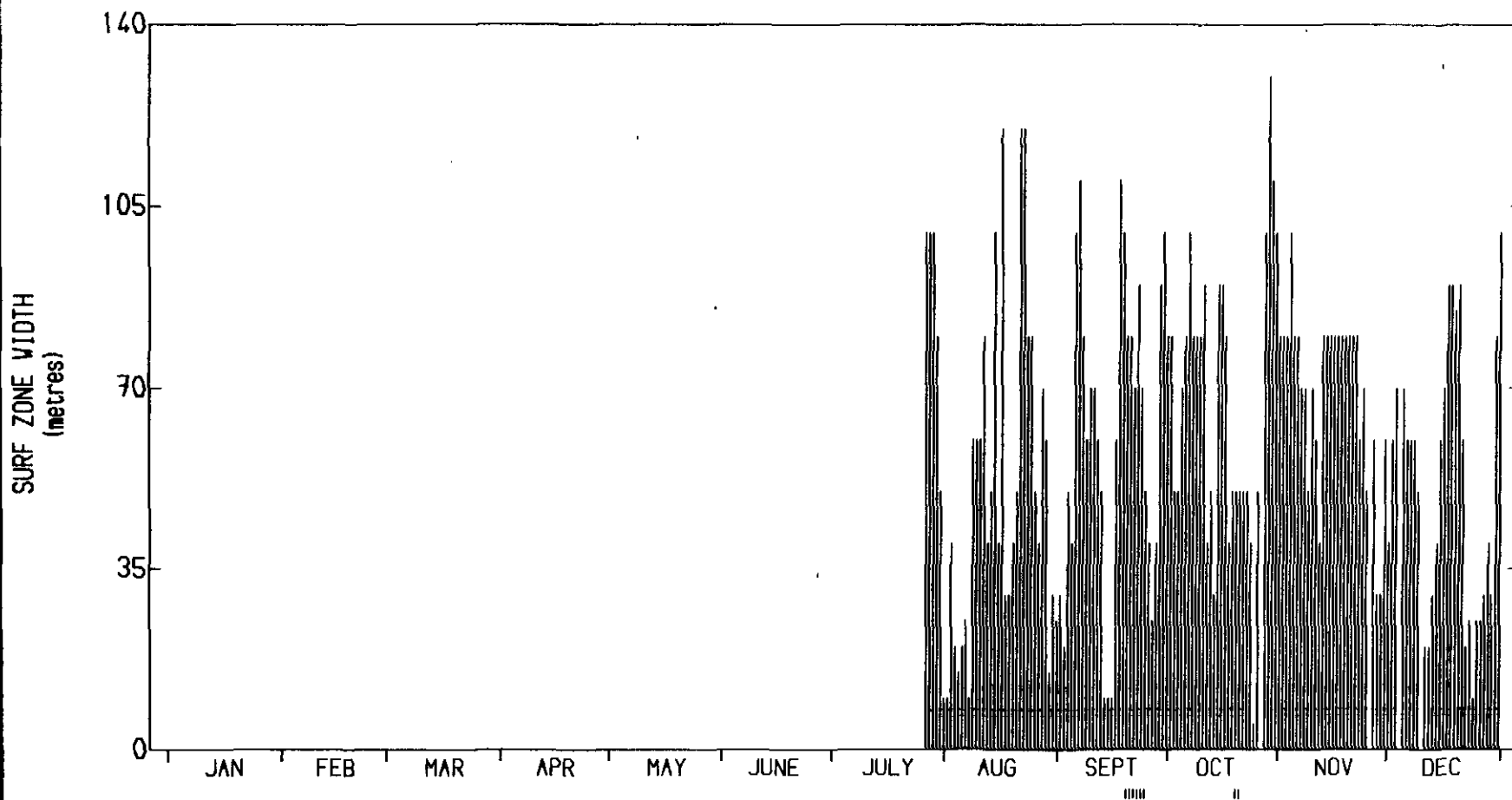
C 28.1

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BUDDINA BEACH

0603



SURF ZONE WIDTH SUMMARY - 1985

No. of Observations : 155

MORNING OBSERVATIONS

Mean Surf Zone Width = 60.6 m

||| Indicates Offshore Bar Present



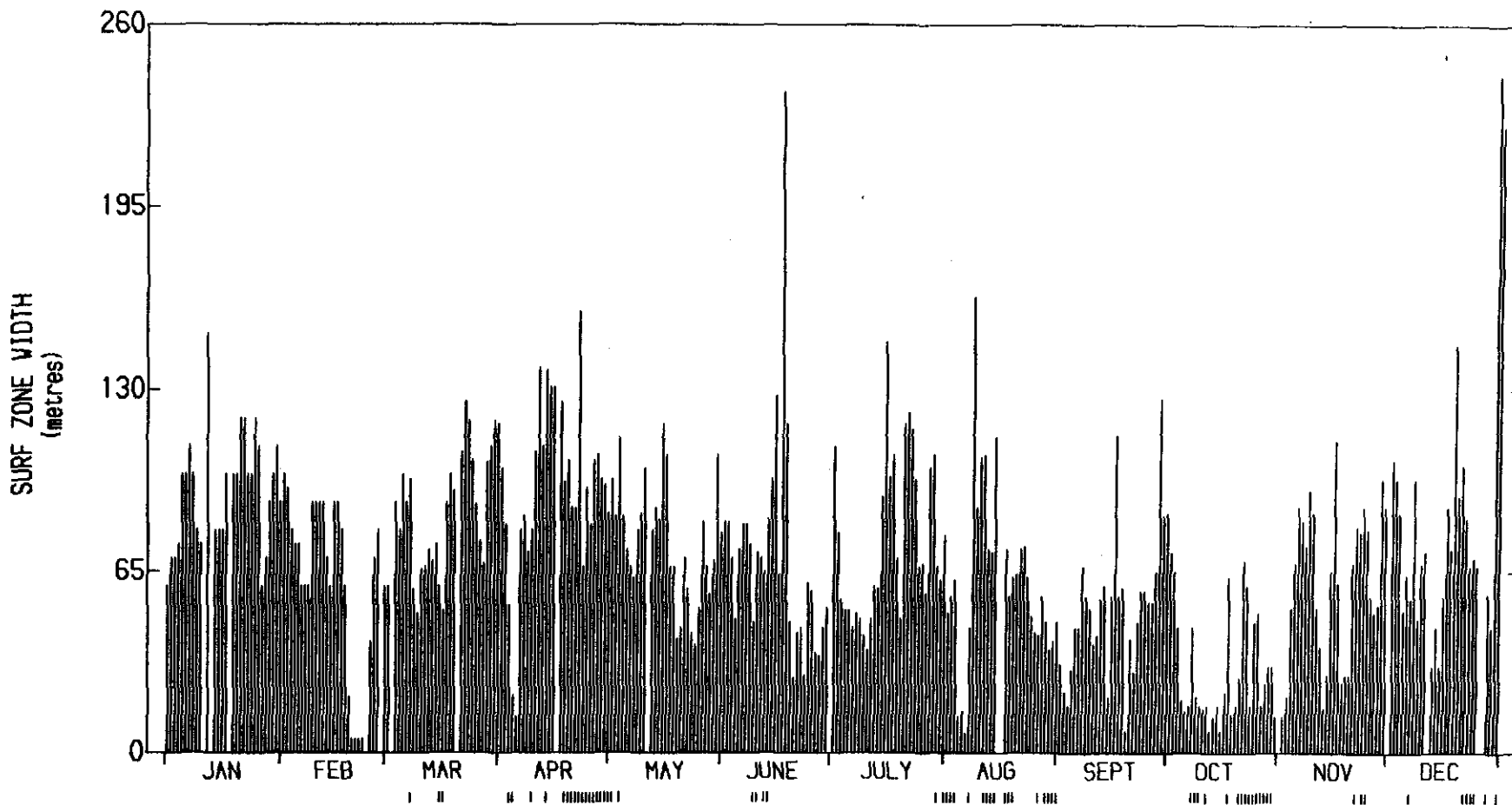
SURF ZONE WIDTH - MORNING 1986

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BUDDINA BEACH

0603



SURF ZONE WIDTH SUMMARY - 1986

No. of Observations : 351

MORNING OBSERVATIONS

Mean Surf Zone Width = 70.7 m

||| Indicates Offshore Bar Present

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Buddina Beach
Figure
11
C 28.1



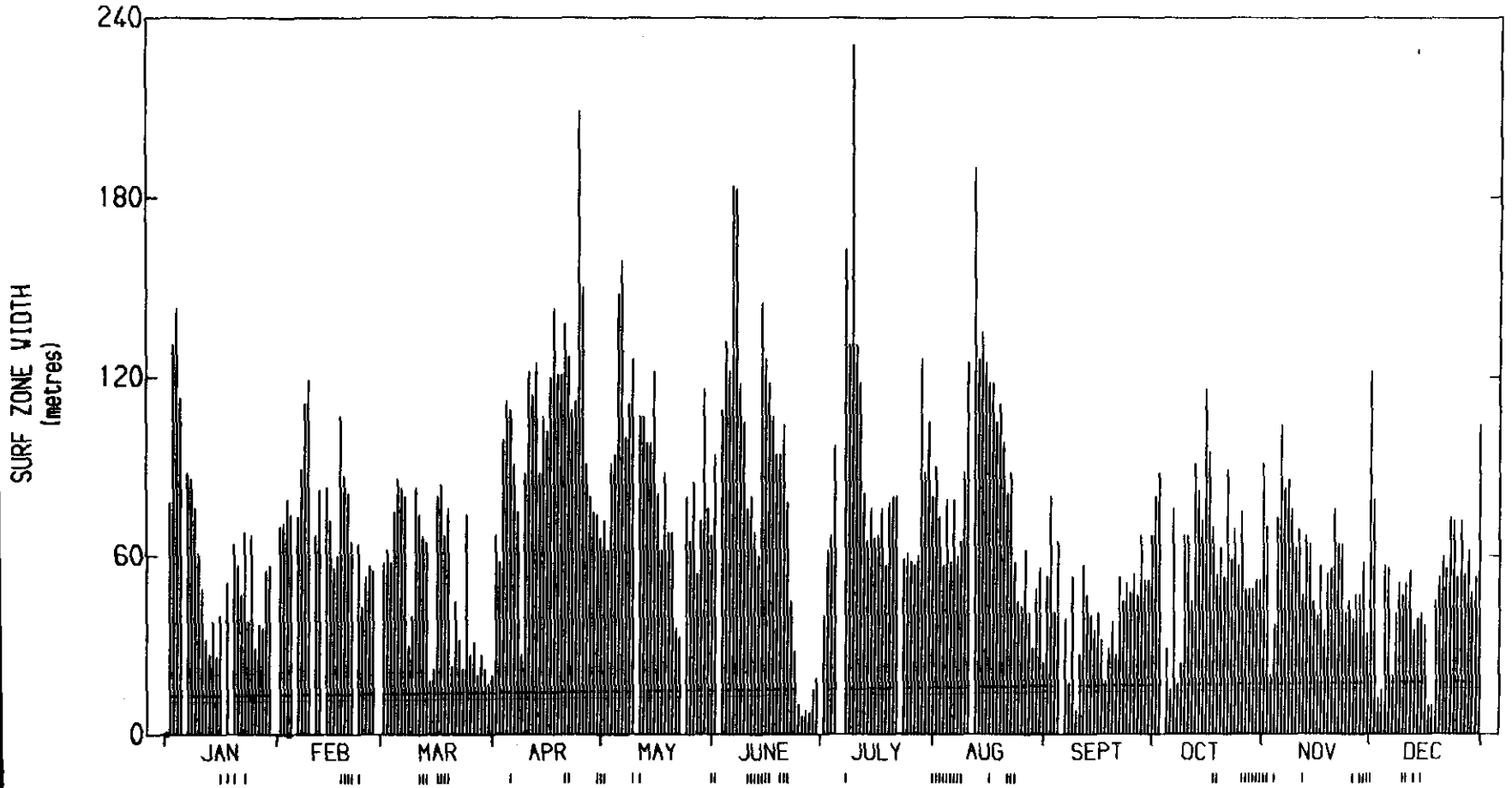
SURF ZONE WIDTH - MORNING 1987

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Programme Engineering

CALOUNDRA CITY

BUDDINA BEACH

0603



SURF ZONE WIDTH SUMMARY - 1987

No. of Observations : 346

MORNING OBSERVATIONS

Mean Surf Zone Width = 70.3 m

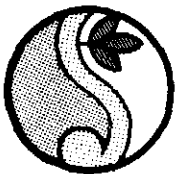
▄ Indicates Offshore Bar Present

C 28.1

Figure
12

Buddina Beach

COPE



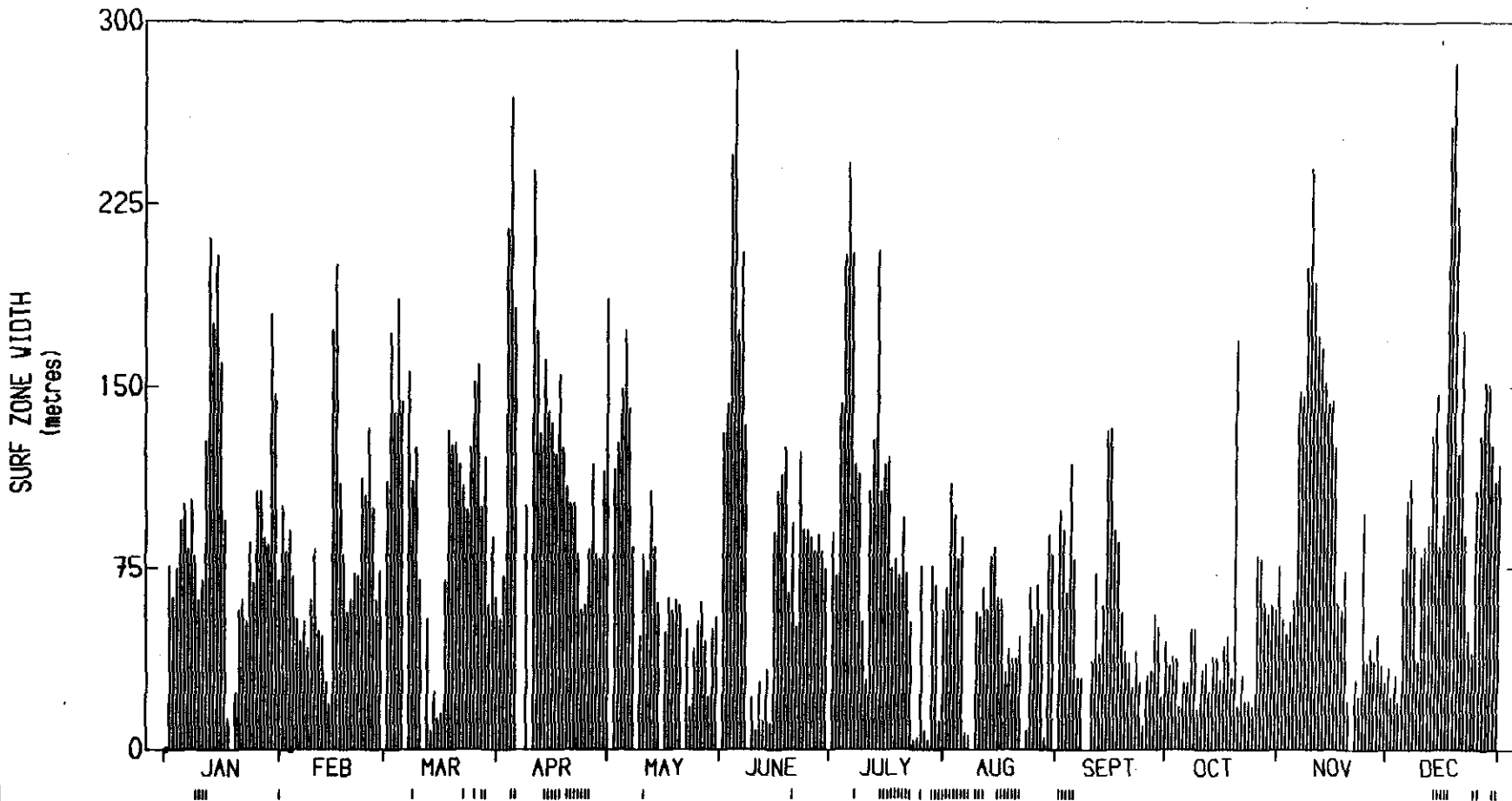
SURF ZONE WIDTH - MORNING 1988

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BUDDINA BEACH

0603



SURF ZONE WIDTH SUMMARY - 1988

No. of Observations : 348

MORNING OBSERVATIONS

Mean Surf Zone Width = 86.0 m

||| Indicates Offshore Bar Present

C 28.1

13

Figure

Buddina Beach

COPE



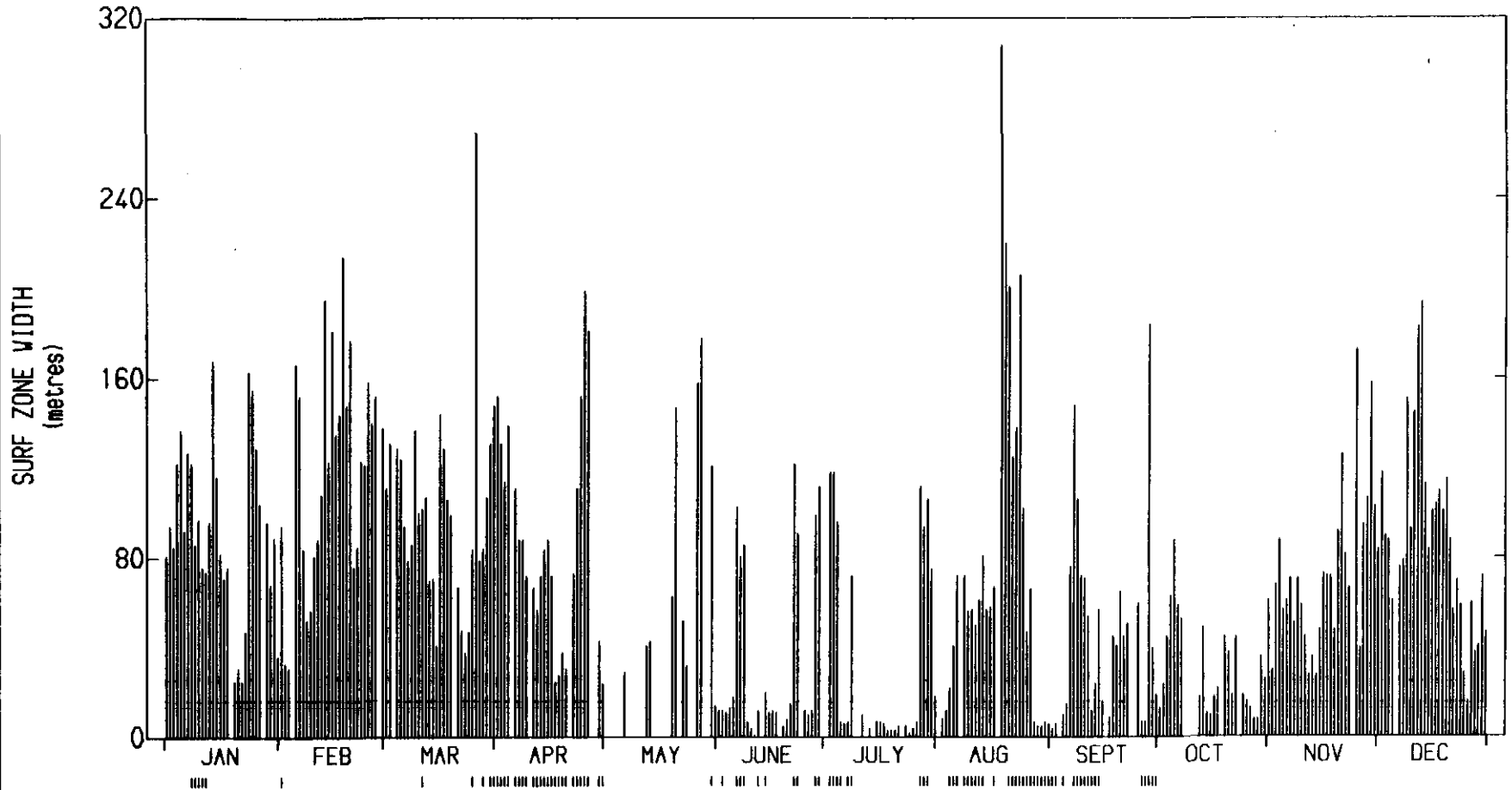
SURF ZONE WIDTH - MORNING 1989

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BUDDINA BEACH

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SURF ZONE WIDTH SUMMARY - 1989

No. of Observations : 318

MORNING OBSERVATIONS

Mean Surf Zone Width = 72.8 m

u Indicates Offshore Bar Present

Buddina Beach

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Figure

14

C 28.1



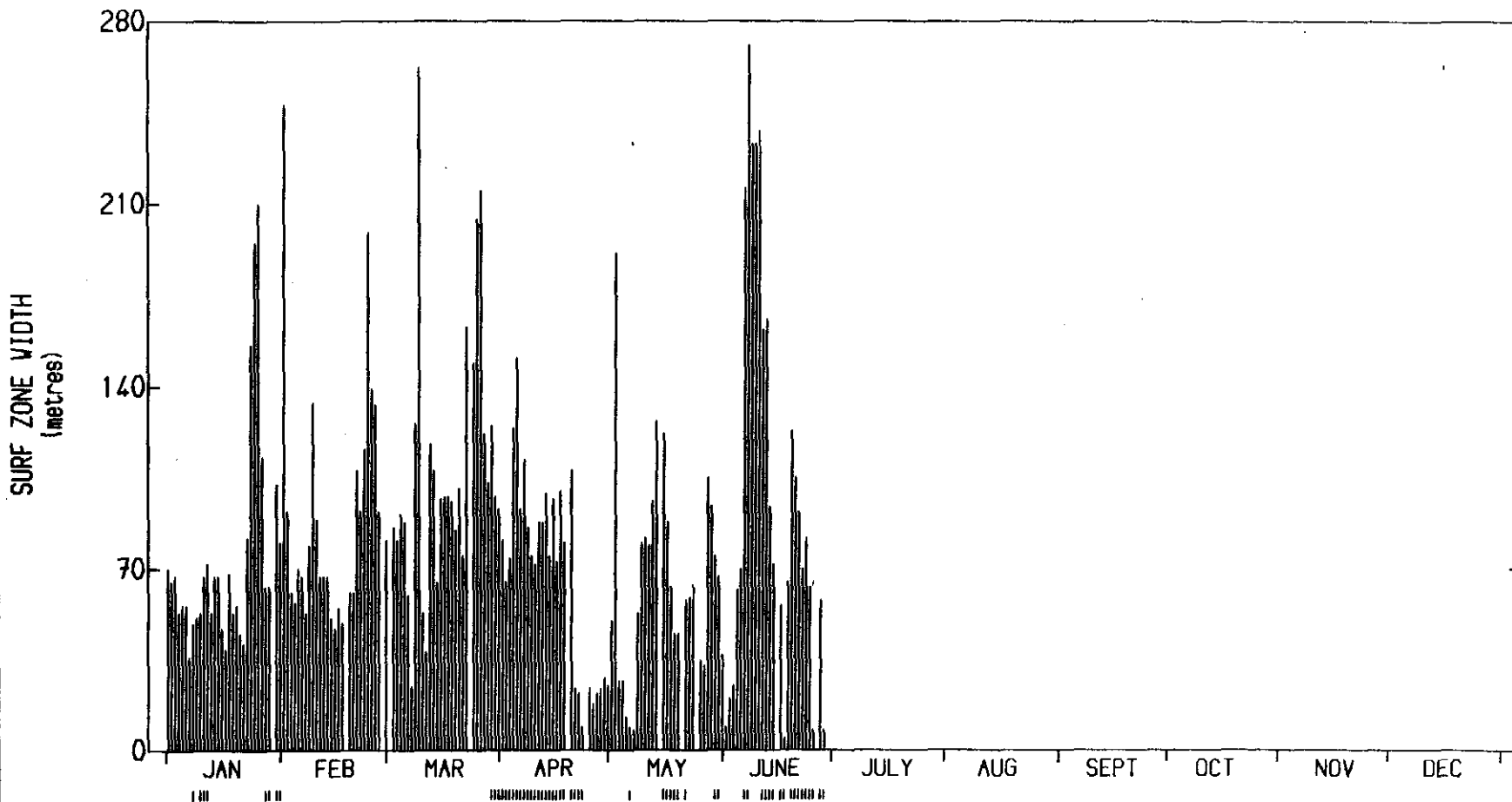
SURF ZONE WIDTH - MORNING 1990

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SURF ZONE WIDTH SUMMARY - 1990

No. of Observations : 169

MORNING OBSERVATIONS

Mean Surf Zone Width = 84.2 m

|| Indicates Offshore Bar Present

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Buddina Beach

Figure

15

C 28.1



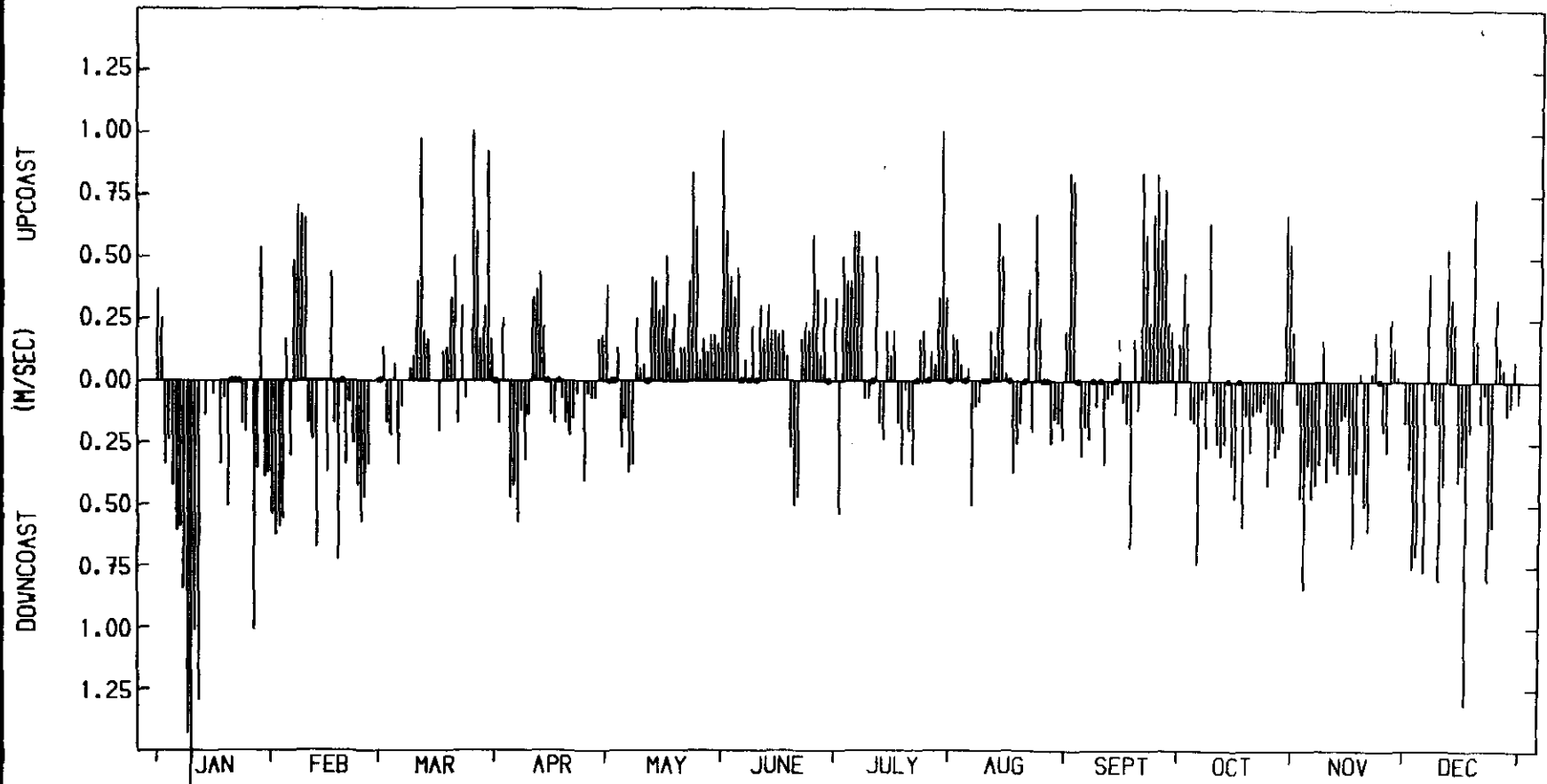
LITTORAL CURRENTS - MORNING 1979

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PROGRAMME ENGINEERING

CALOUNDRA CITY

BUDDINA BEACH

0603



LITTORAL CURRENT SUMMARY - 1979

MEAN VEL = $-.014$ M/SEC (DOWN)

MEAN UPCAST VEL = $.338$ M/SEC

MEAN DOWNCAST VEL = $.331$ M/SEC

MORNING OBSERVATIONS - (349 RECORDINGS)

COPE

Buddina Beach

Figure

16

C 28.1



LITTORAL CURRENTS - MORNING 1980

Buddina Beach

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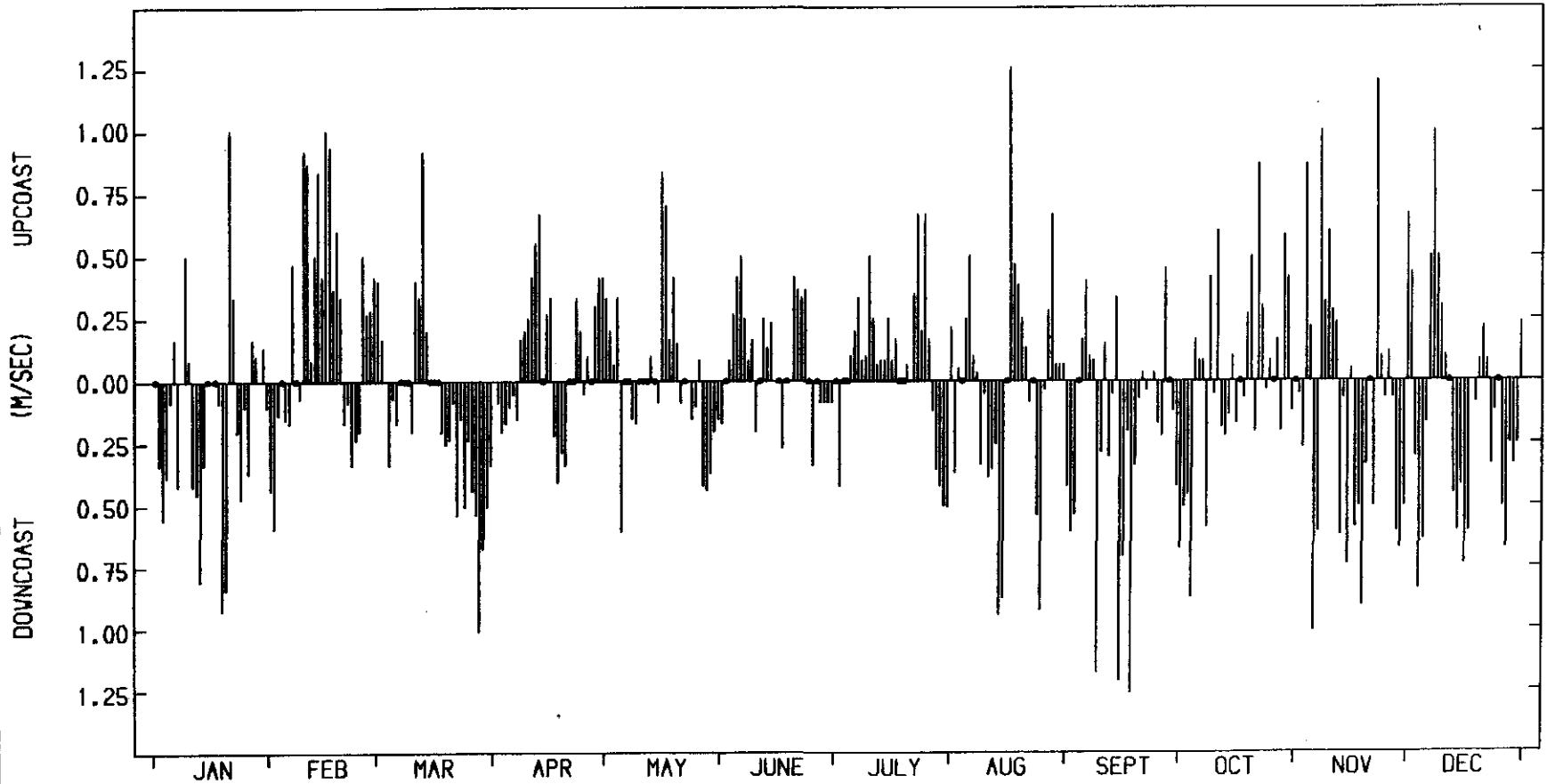
Figure
17
C 28.1

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CALOUNDRA CITY

BUDDINA BEACH

0603



LITTORAL CURRENT SUMMARY - 1980

MEAN VEL = -.020 M/SEC (DOWN)

MEAN UPCOAST VEL = .337 M/SEC

MEAN DOWNCOAST VEL = .353 M/SEC

MORNING OBSERVATIONS - (355 RECORDINGS)



LITTORAL CURRENTS - MORNING 1981

Buddina Beach

COPE

Figure

18

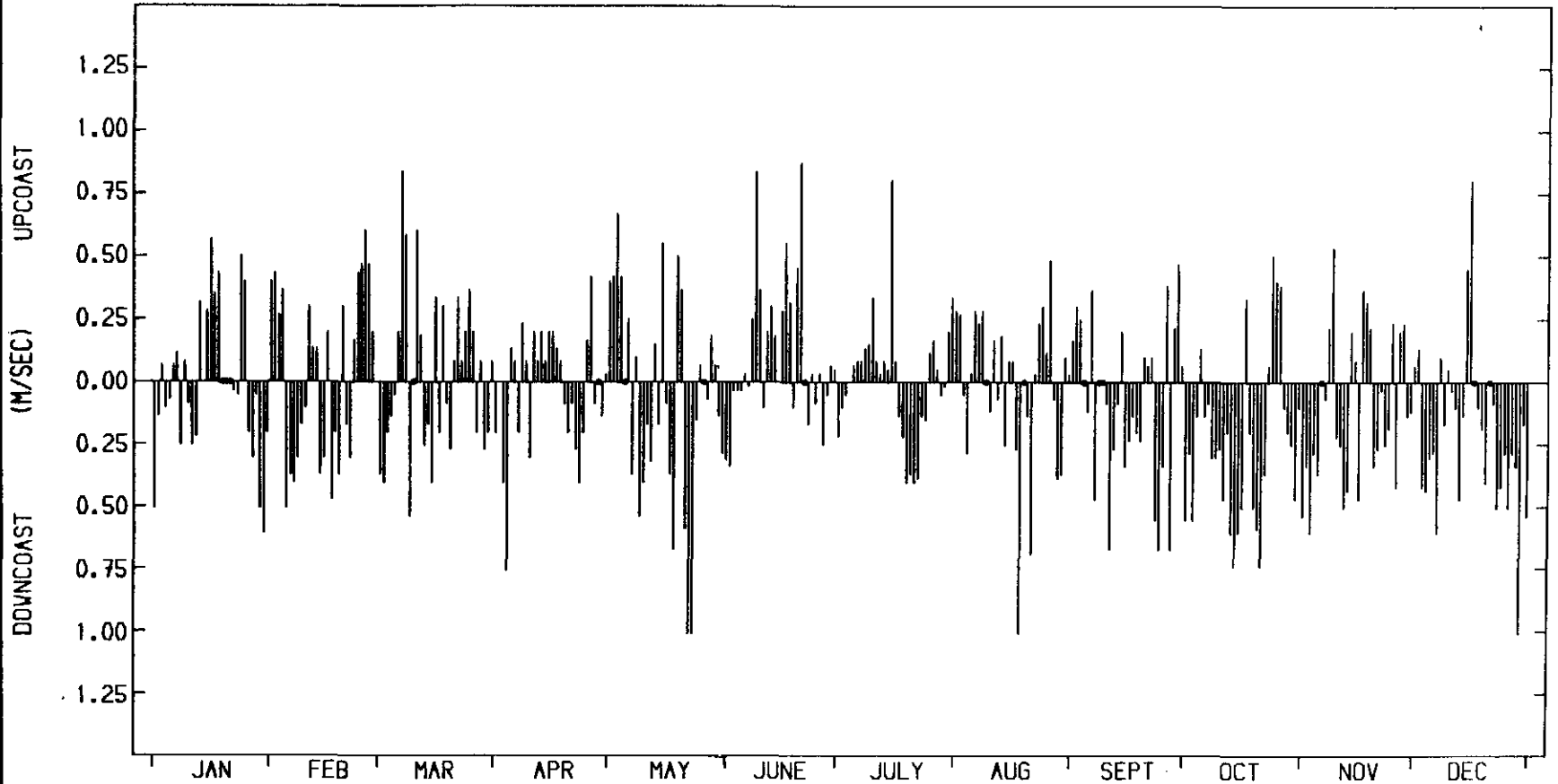
C28.1

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PROGRAMME ENGINEERING

CALOUNDRA CITY

BUDDINA BEACH

0603



LITTORAL CURRENT SUMMARY - 1981

MEAN VEL = -.053 M/SEC (DOWN)

MEAN UPCOAST VEL = .252 M/SEC

MEAN DOWNCOAST VEL = .300 M/SEC

MORNING OBSERVATIONS - (361 RECORDINGS)



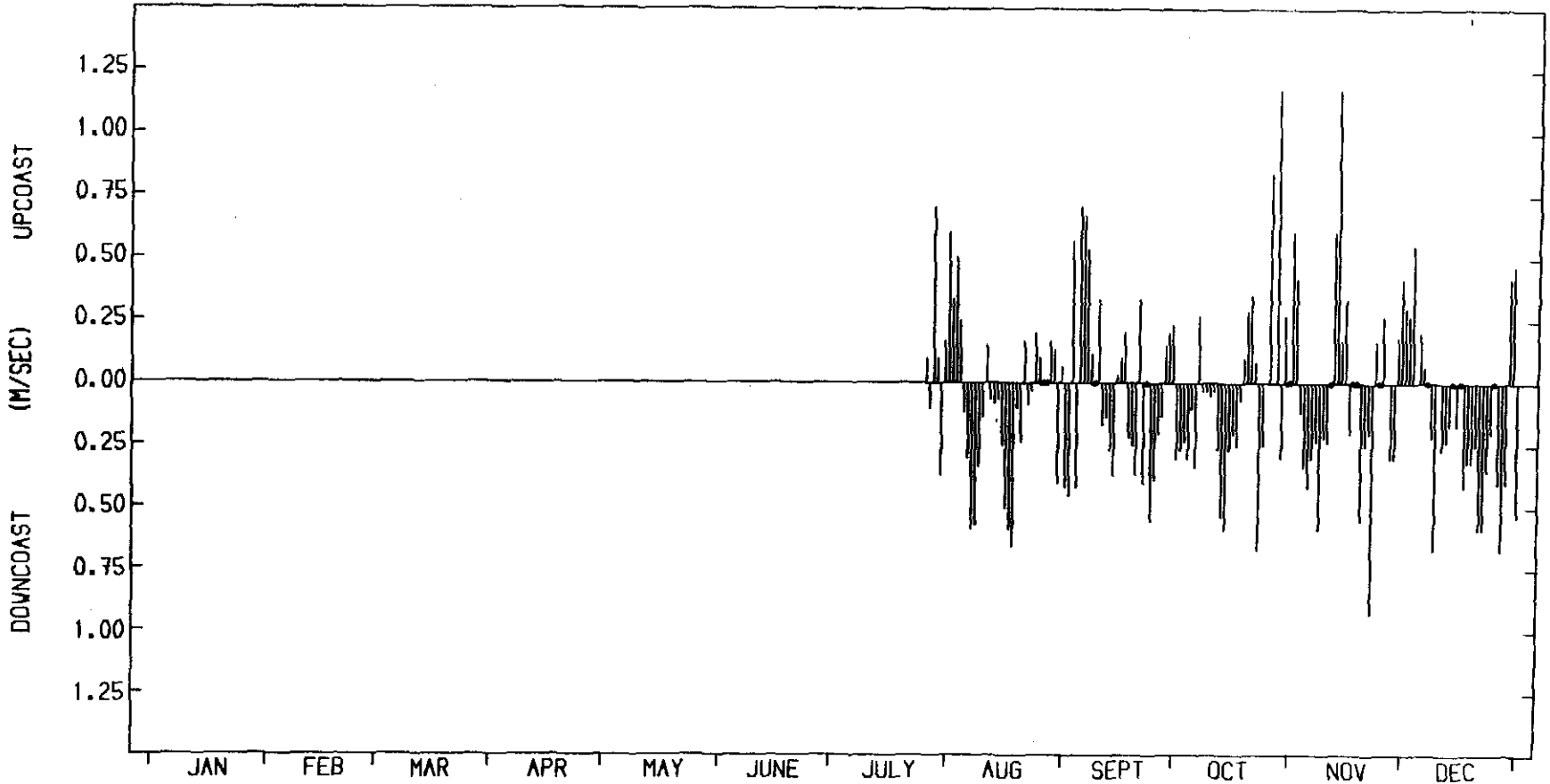
LITTORAL CURRENTS - MORNING 1985

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PROGRAMME ENGINEERING

CALOUNDRA CITY

BUDDINA BEACH

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LITTORAL CURRENT SUMMARY - 1985

MEAN VEL = -.061 M/SEC (DOWN)

MEAN UPCOAST VEL = .336 M/SEC

MEAN DOWNCOAST VEL = .309 M/SEC

MORNING OBSERVATIONS - (154 RECORDINGS)

COPE

Buddina Beach

Figure

19

C 28.1



LITTORAL CURRENTS - MORNING 1986

COPE

Buddina Beach

Figure

20

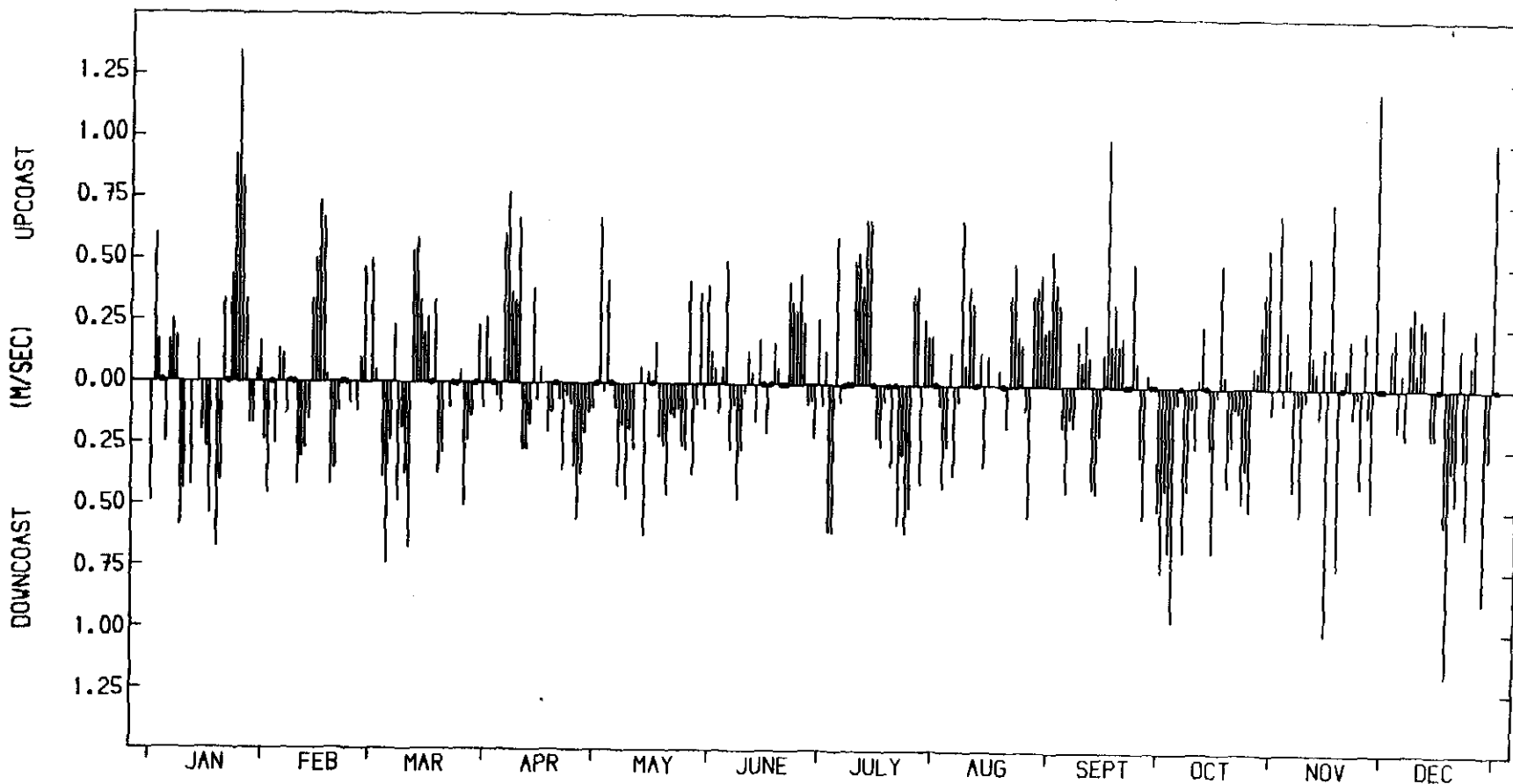
C 28.1

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CALOUNDRA CITY

BUDDINA BEACH

0603



LITTORAL CURRENT SUMMARY - 1986

MEAN VEL = -.010 M/SEC (DOWN)

MEAN UPCOAST VEL = .318 M/SEC

MEAN DOWNCOAST VEL = .302 M/SEC

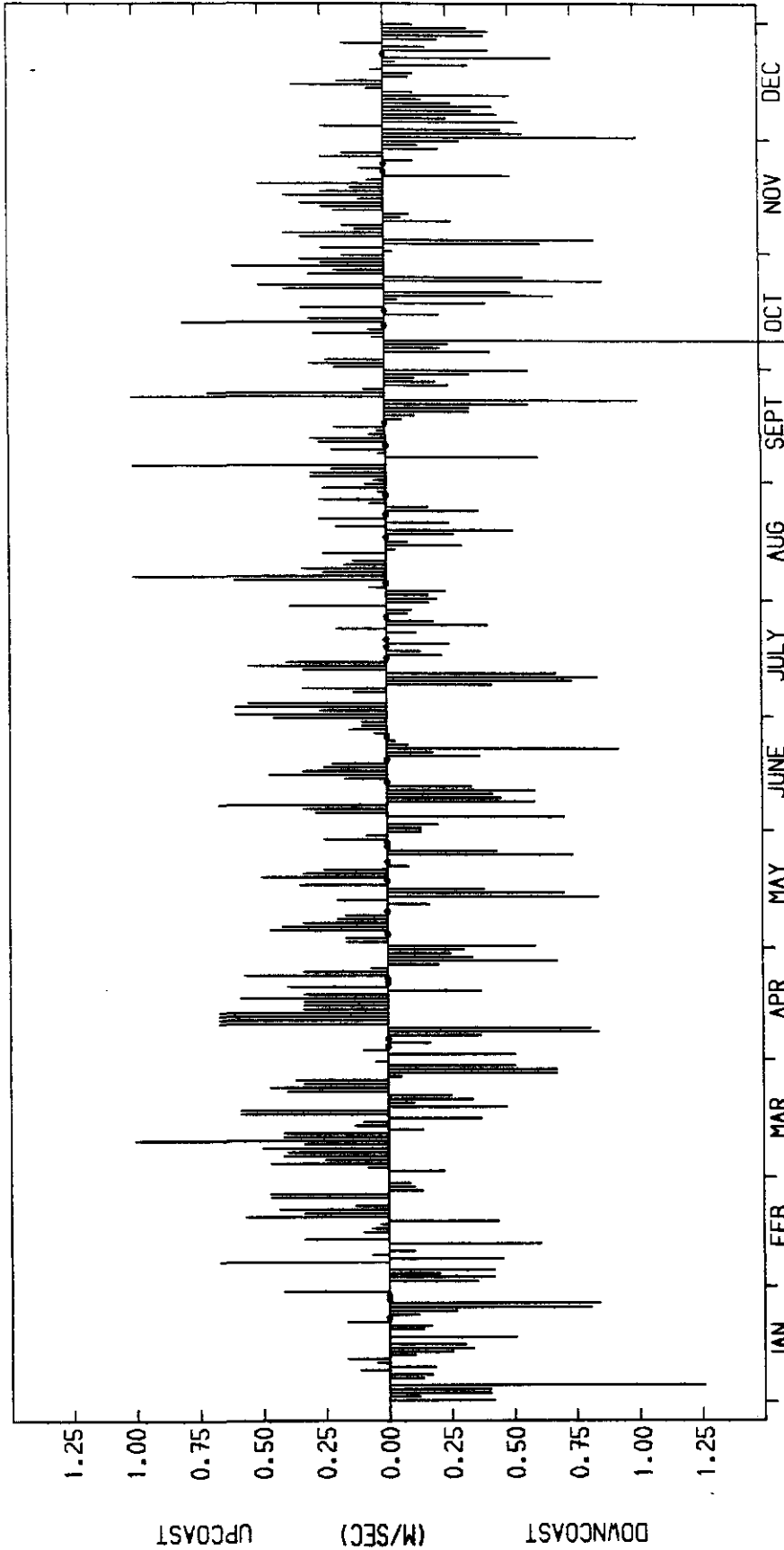
MORNING OBSERVATIONS - (351 RECORDINGS)

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CALOUNDRA CITY

BUDDINA BEACH

0603



LITTORAL CURRENT SUMMARY - 1987

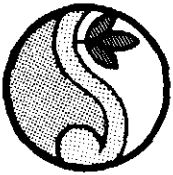
MEAN VEL = -.022 M/SEC (DOWN) MEAN UP-CAST VEL = .309 M/SEC MEAN DOWN-CAST VEL = .361 M/SEC
MORNING OBSERVATIONS - (345 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1987

COPE
Buddina Beach
Figure
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C 28.1



LITTORAL CURRENTS - MORNING 1988

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Buddina Beach

Figure
22

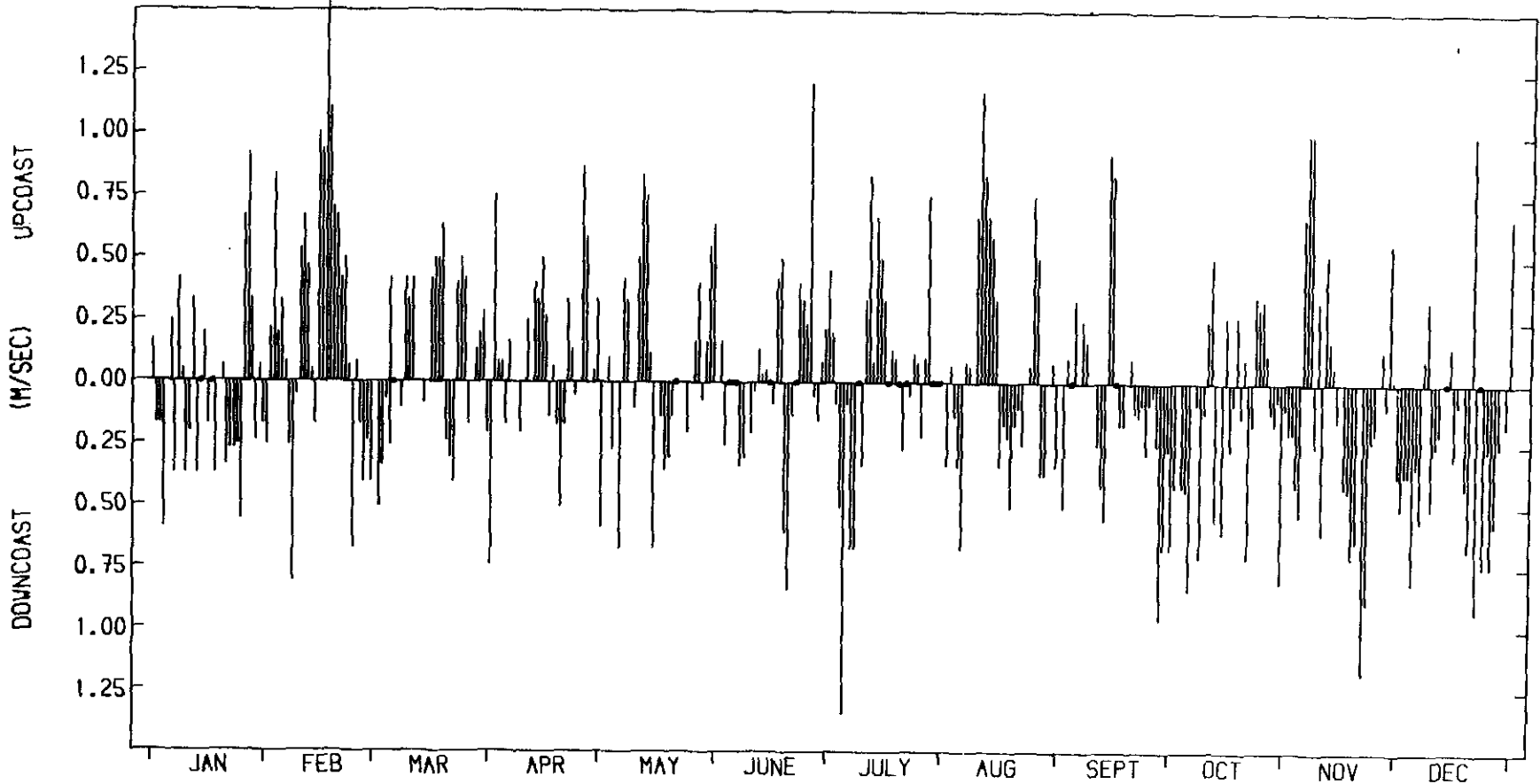
C 28.1

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PROGRAMME ENGINEERING

CALOUNDRA CITY

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0603



LITTORAL CURRENT SUMMARY - 1988

MEAN VEL = $-.002$ M/SEC (DOWN)

MEAN UP/COAST VEL = $.394$ M/SEC

MEAN DOWN/COAST VEL = $.345$ M/SEC

MORNING OBSERVATIONS - (326 RECORDINGS)



LITTORAL CURRENTS - MORNING 1989

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Buddina Beach

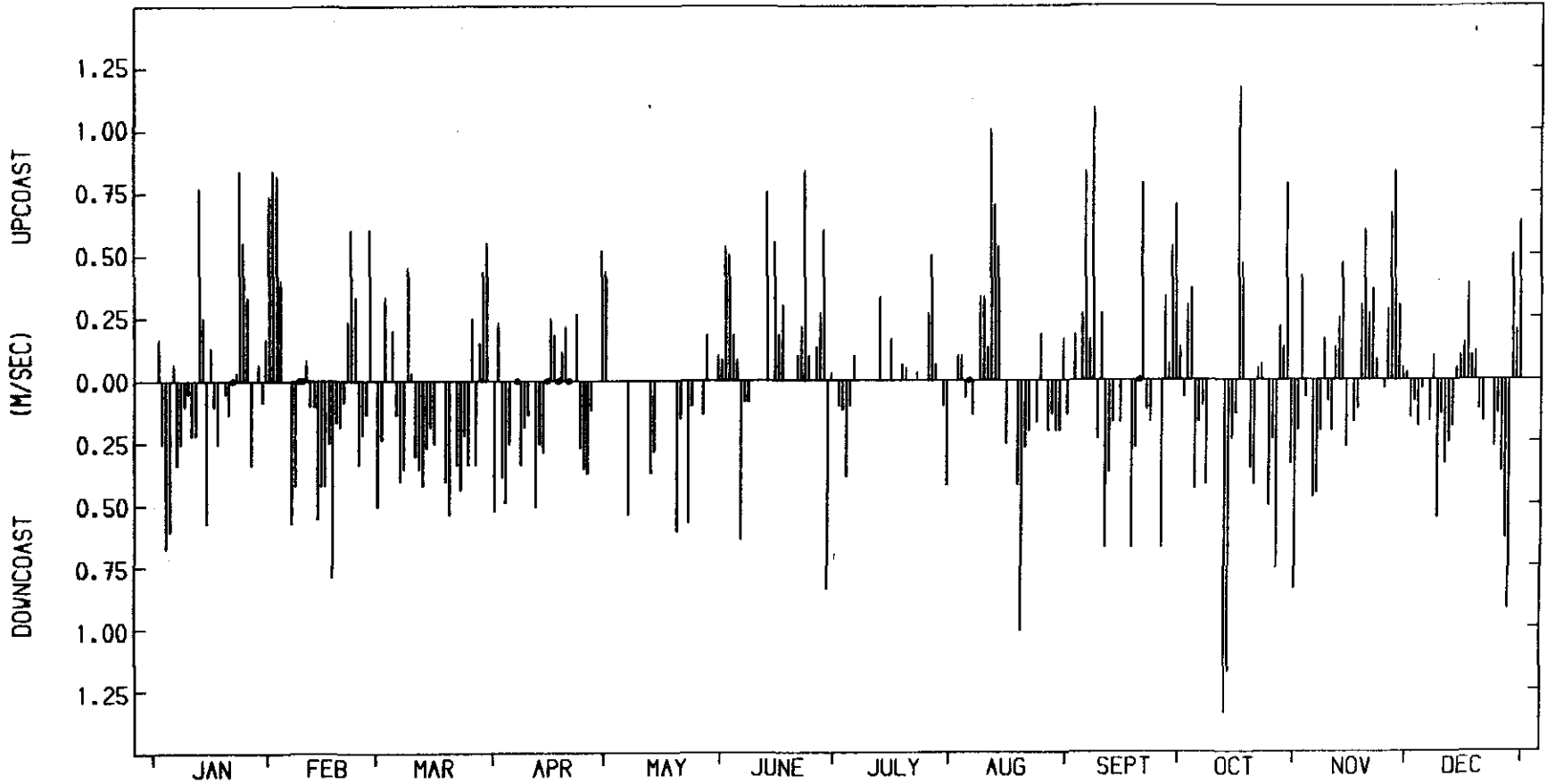
Figure
23
C 28.1

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BUDDINA BEACH

0603



LITTORAL CURRENT SUMMARY - 1989

MEAN VEL = -.025 M/SEC (DOWN)

MEAN UPCAST VEL = .328 M/SEC

MEAN DOWNCAST VEL = .311 M/SEC

MORNING OBSERVATIONS - (282 RECORDINGS)



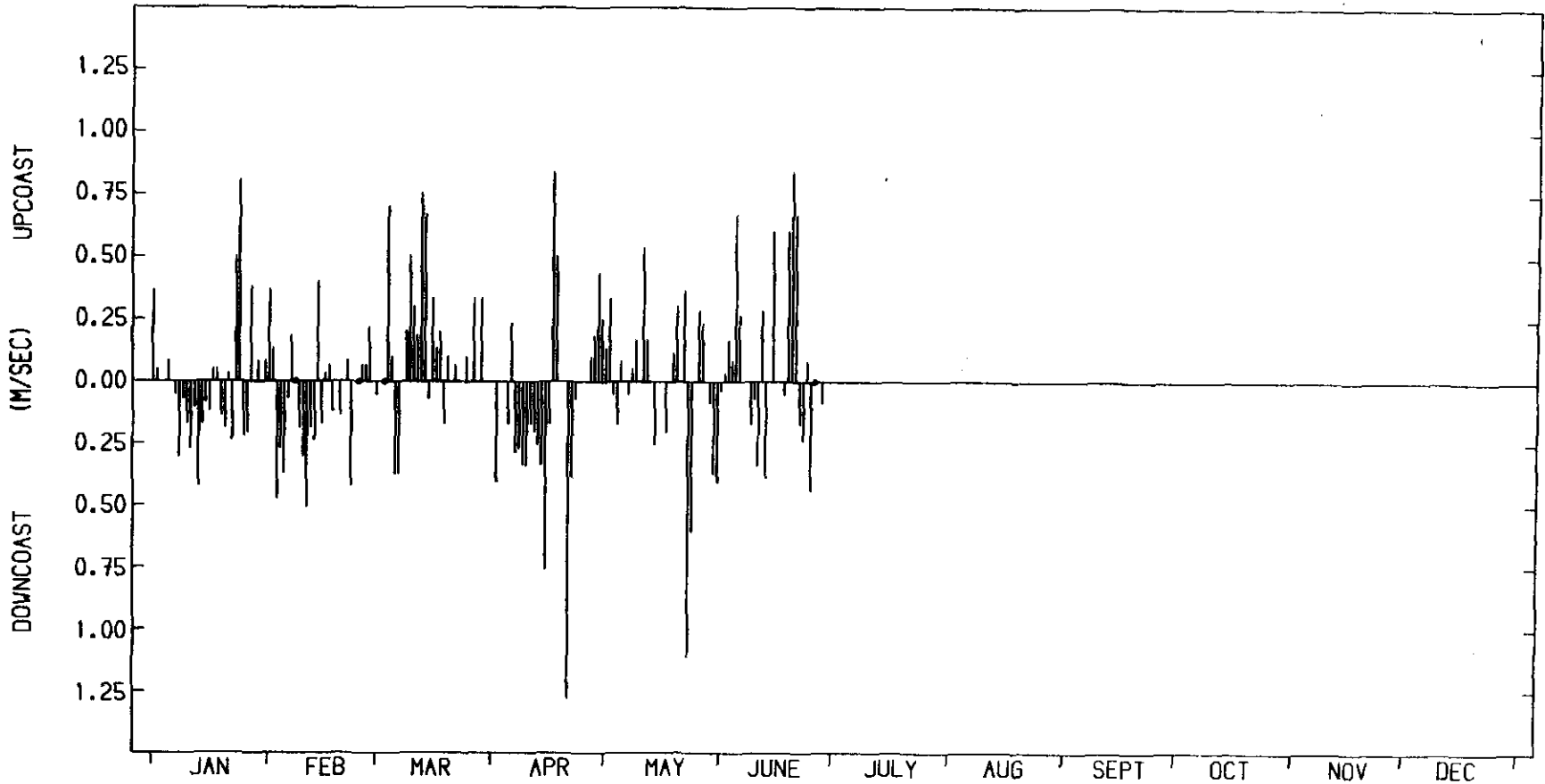
LITTORAL CURRENTS - MORNING 1990

COPE - COASTAL OBSERVATION
PROGRAMME ENGINEERING

CALOUNDRA CITY

BUDDINA BEACH

0603



LITTORAL CURRENT SUMMARY - 1990

MEAN VEL = .007 M/SEC (UP)

MEAN UPCAST VEL = .279 M/SEC

MEAN DOWNCAST VEL = .260 M/SEC

MORNING OBSERVATIONS - (139 RECORDINGS)

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Buddina Beach

Figure

24

C 28.1



BEACH PROFILE PARAMETERS - 1979

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Buddina Beach

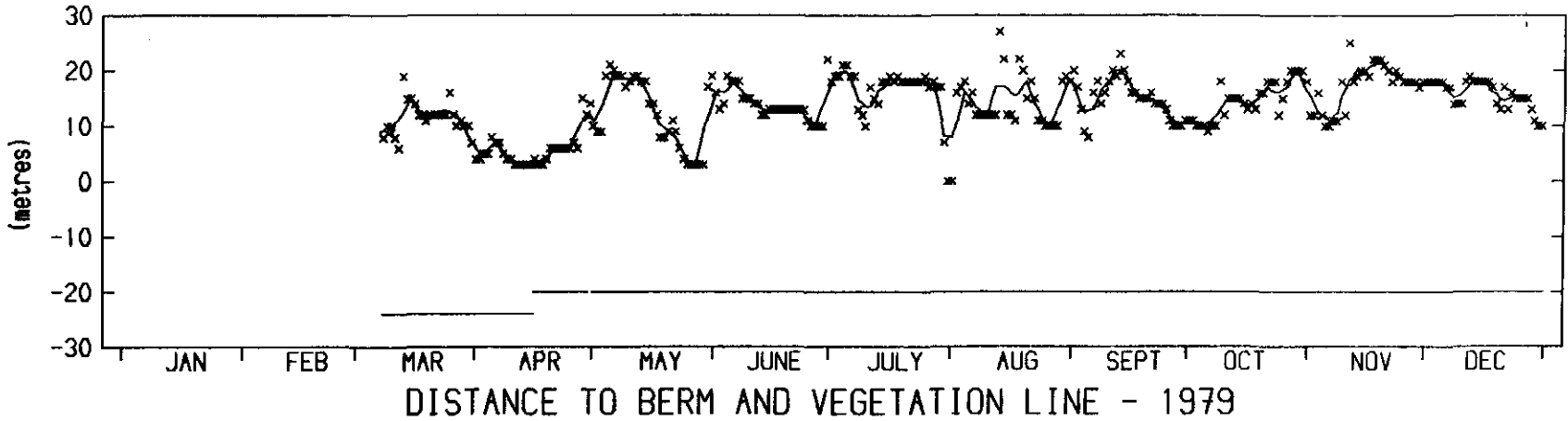
Figure
25
C 28.1

COPE - Coastal Observation
Programme Engineering

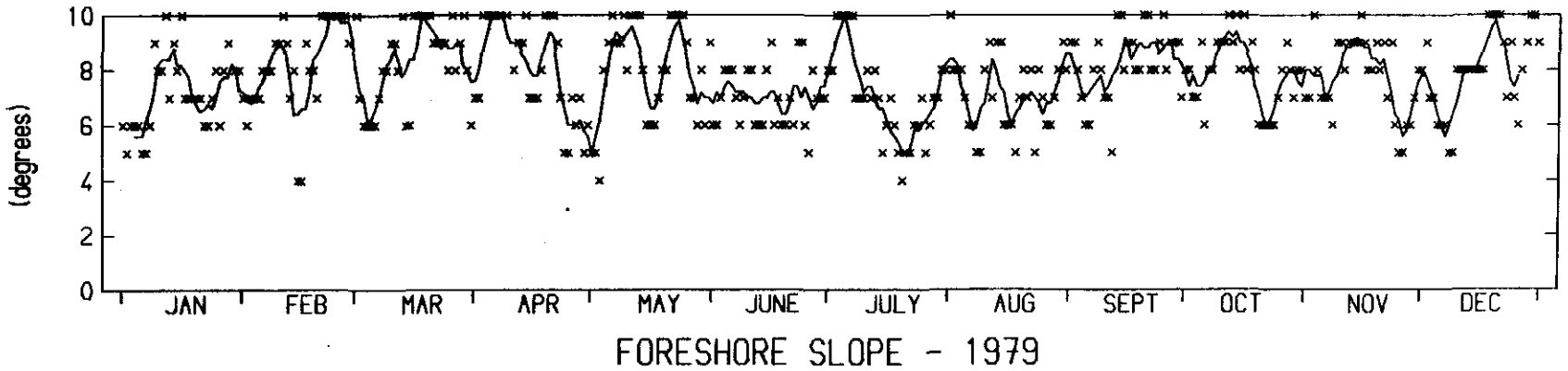
CALOUNDRA CITY

BUDDINA BEACH

0603



xxxxx Indicates Distance to Berm : 299 Observations
— Indicates Distance to Vegetation Line : 298 Observations



Five Day Moving Average

No. of Observations : 360



BEACH PROFILE PARAMETERS - 1980

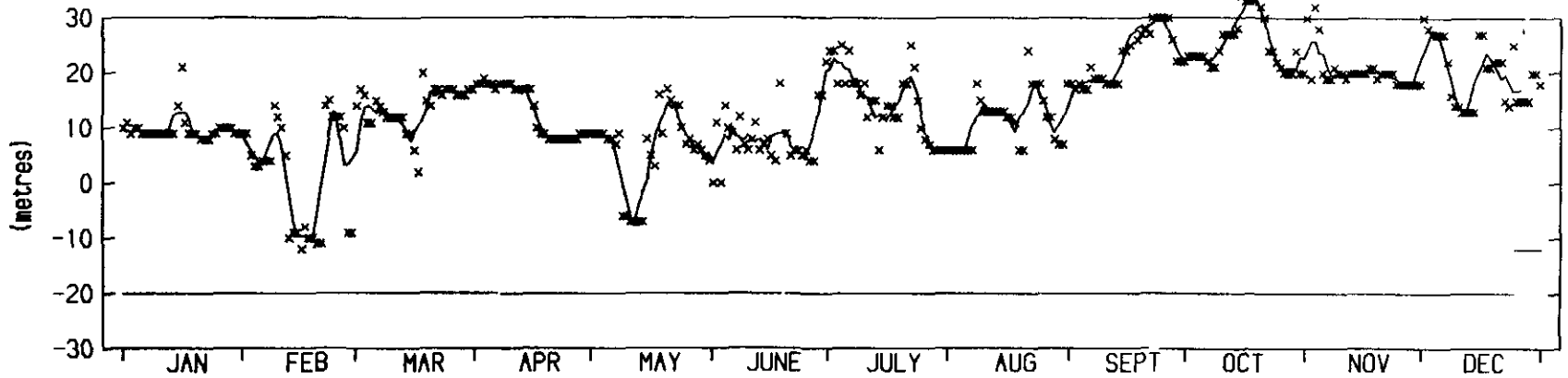
COPE
Buddina Beach
Figure
26
C 28.1

COPE - Coastal Observation
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CALOUNDRA CITY

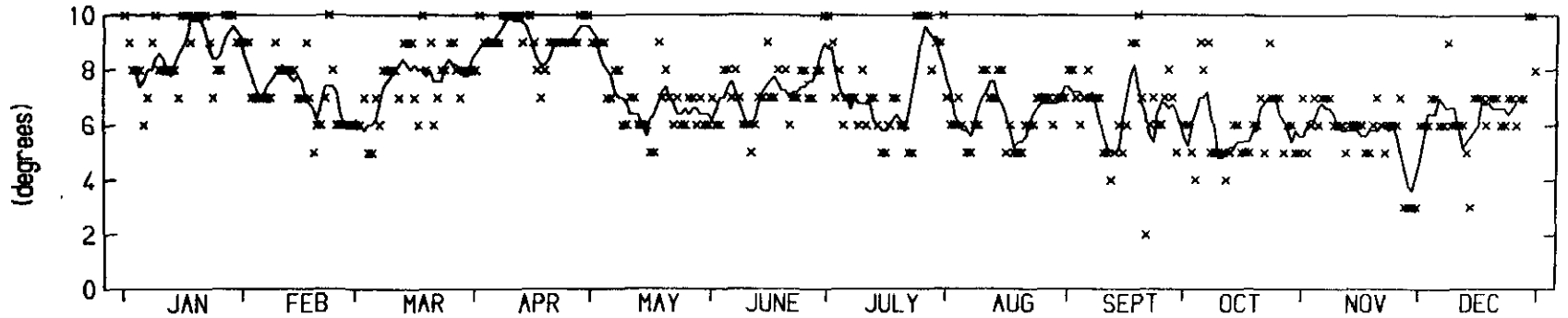
BUDDINA BEACH

0603



DISTANCE TO BERM AND VEGETATION LINE - 1980

xxxxx Indicates Distance to Berm : 365 Observations
— Indicates Distance to Vegetation Line : 364 Observations



FORESHORE SLOPE - 1980

△ Five Day Moving Average

No. of Observations : 364



BEACH PROFILE PARAMETERS - 1981

COPE
Buddina Beach
Figure
27

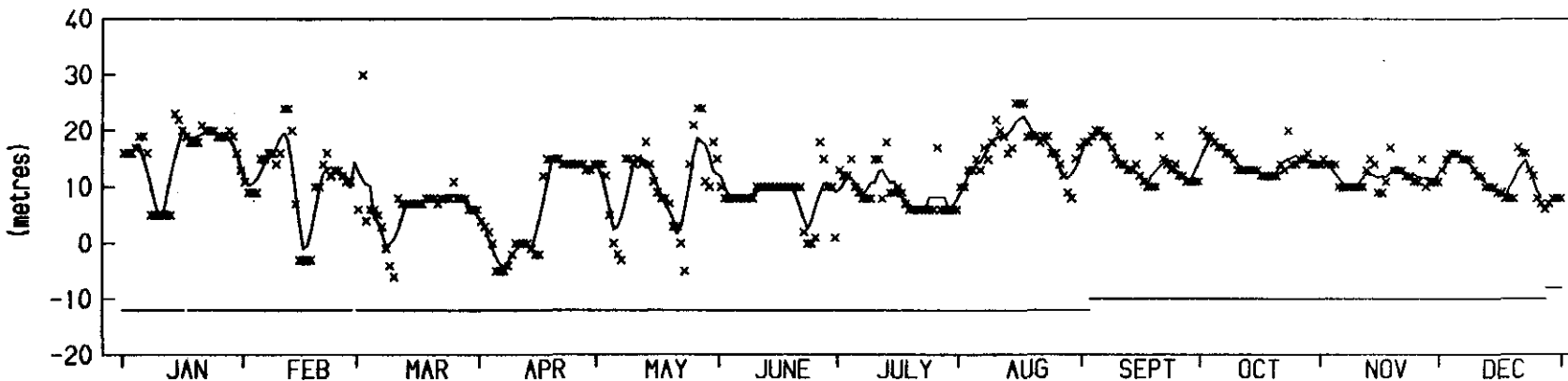
C 28.1

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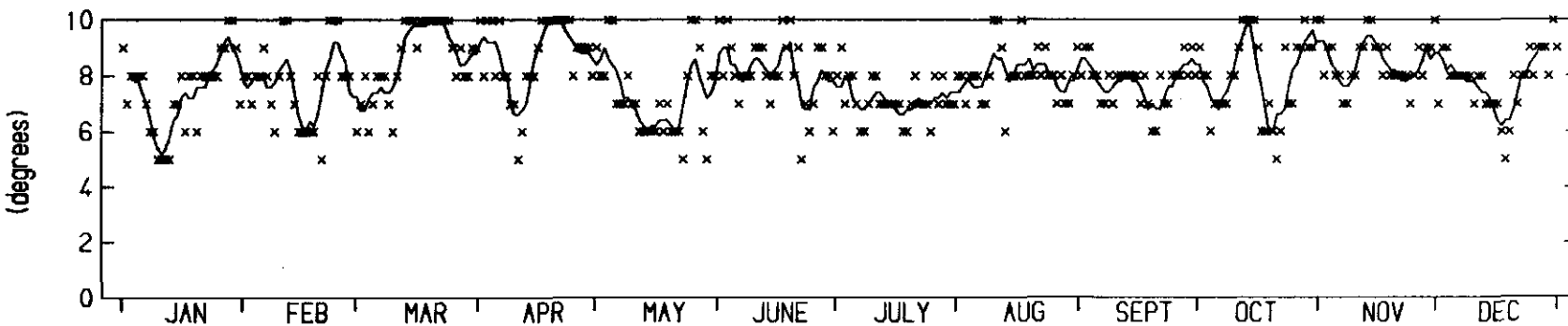
BUDDINA BEACH

0603



DISTANCE TO BERM AND VEGETATION LINE - 1981

xxxxx Indicates Distance to Berm : 365 Observations
— Indicates Distance to Vegetation Line : 364 Observations



FORESHORE SLOPE - 1981

Five Day Moving Average

No. of Observations : 365



BEACH PROFILE PARAMETERS - 1985

COPE
Buddina Beach

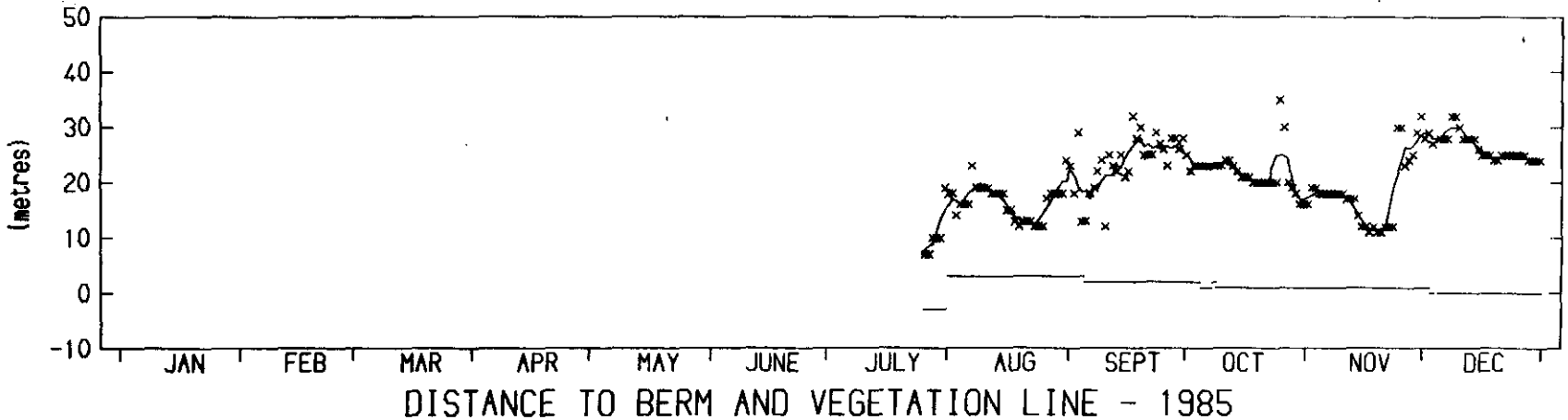
Figure
28
C 28.1

COPE - Coastal Observation
Programme Engineering

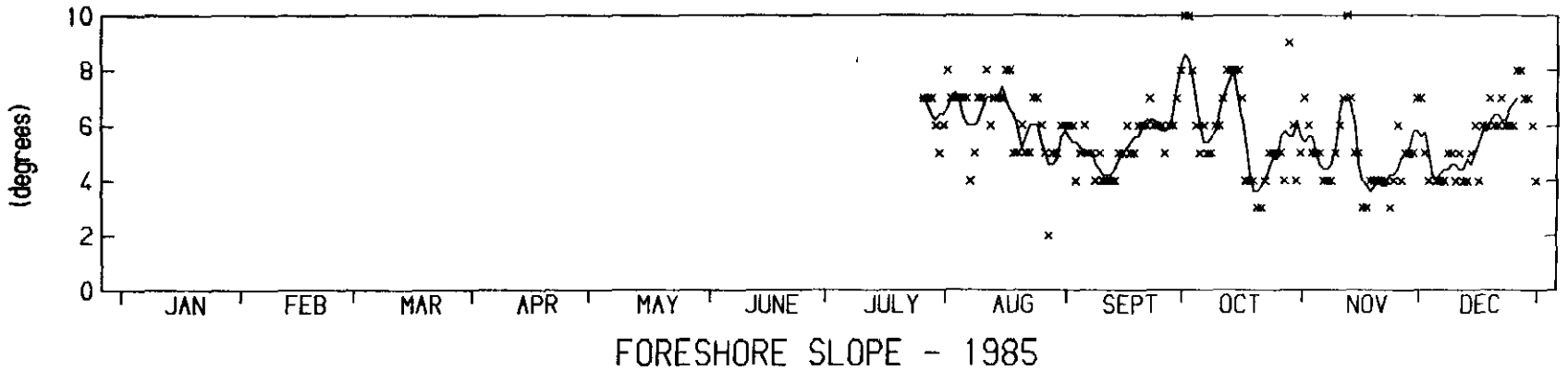
CALOUNDRA CITY

BUDDINA BEACH

0603



x x x x x Indicates Distance to Berm : 158 Observations
— Indicates Distance to Vegetation Line : 158 Observations



Five Day Moving Average

No. of Observations : 158



BEACH PROFILE PARAMETERS - 1986
(Foreshore Slope)

Buddina Beach
Figure
29
C 28.1

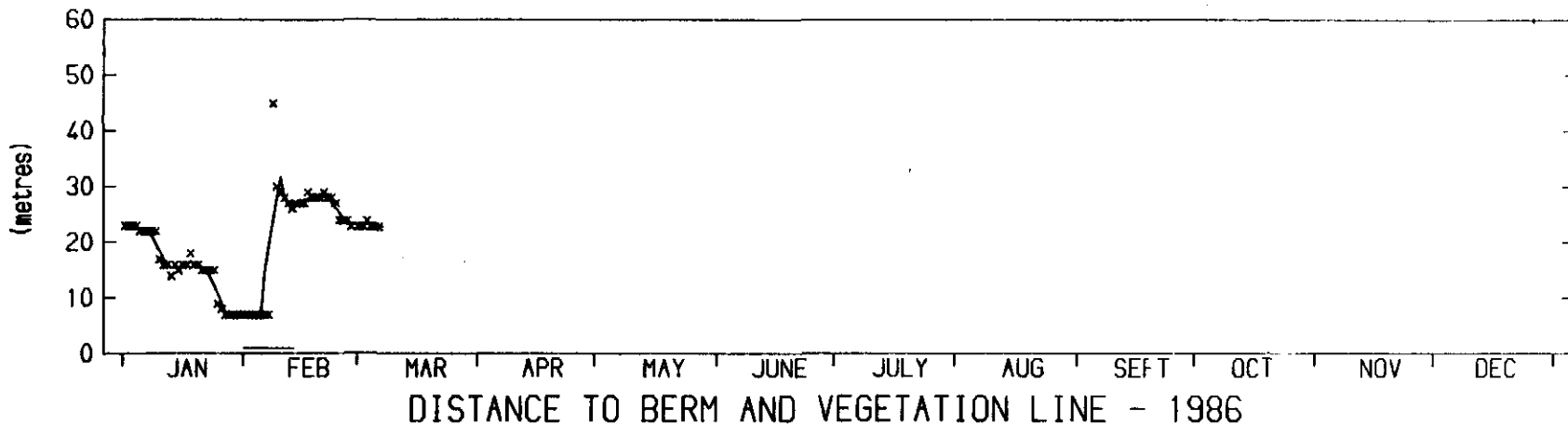
COPE

COPE - Coastal Observation
Programme Engineering

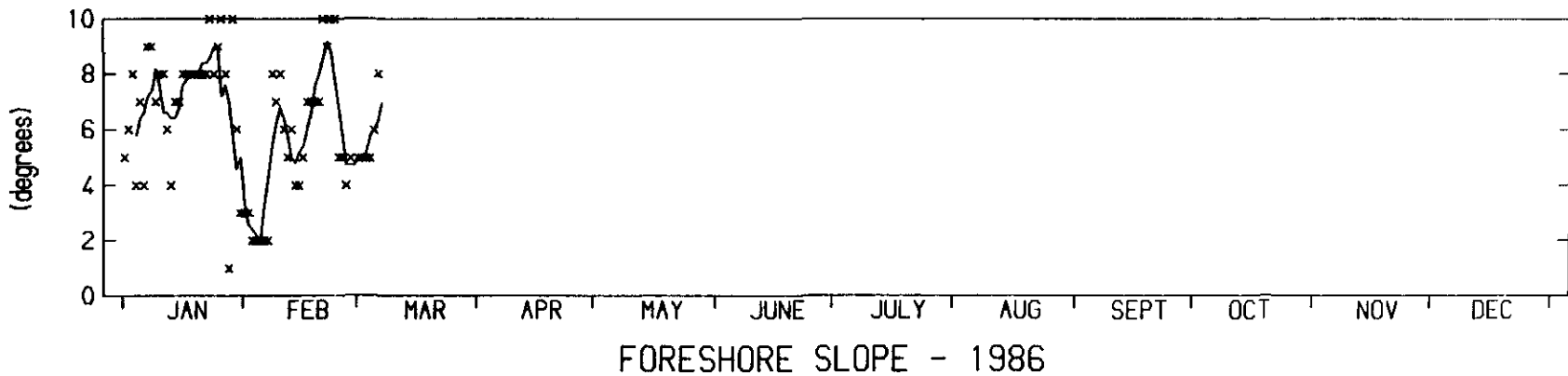
CALOUNDRA CITY

BUDDINA BEACH

0603



xxxx Indicates Distance to Berm : 65 Observations
— Indicates Distance to Vegetation Line : 65 Observations



Five Day Moving Average

No. of Observations : 65



BEACH PROFILE PARAMETERS - 1986

Buddina Beach

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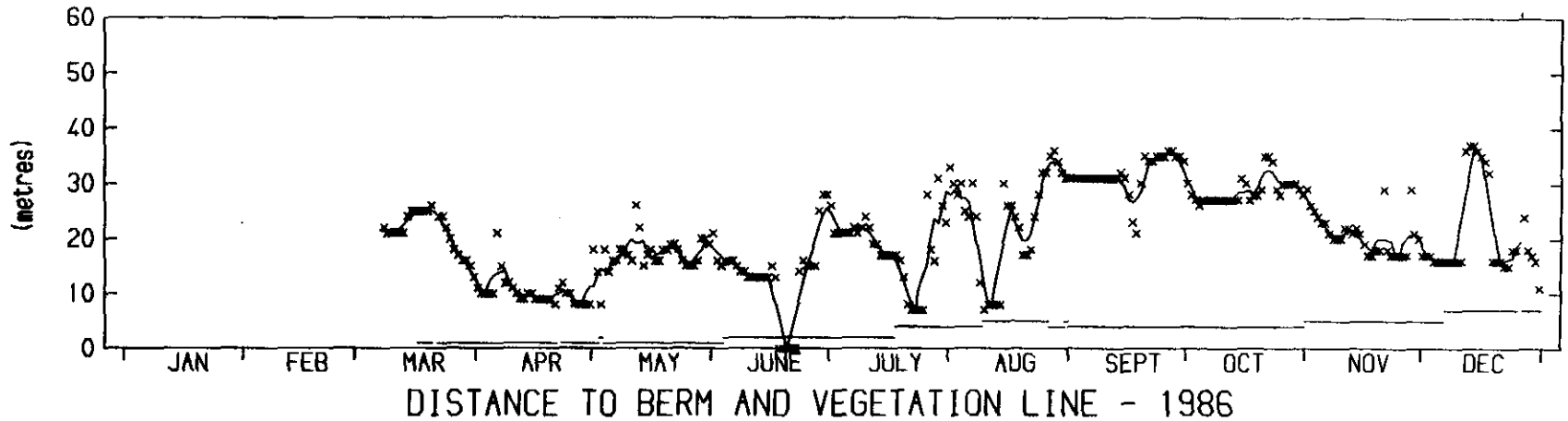
Figure
30
C 28.1

COPE - Coastal Observation
Programme Engineering

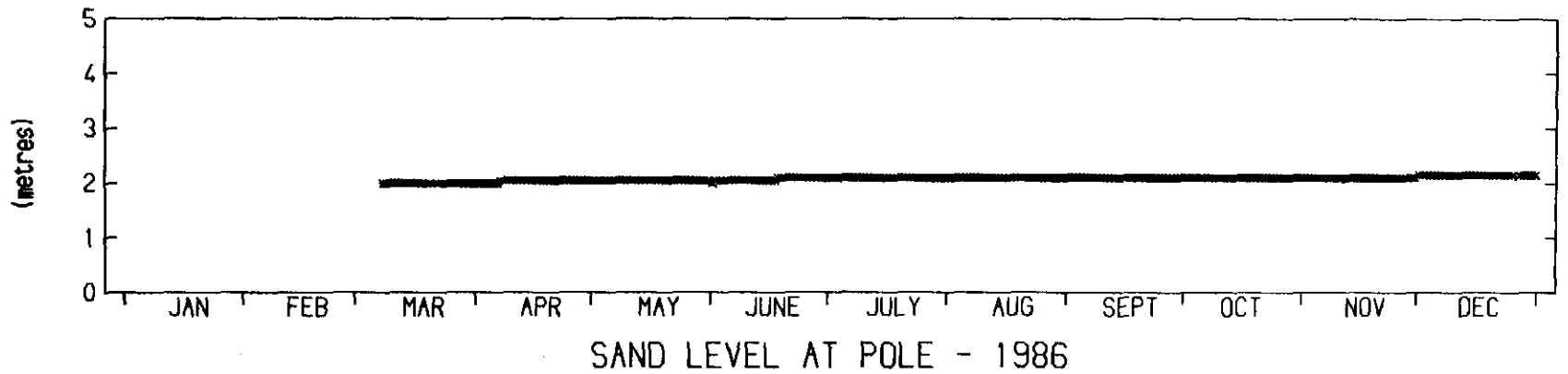
CALOUNDRA CITY

BUDDINA BEACH

0603



xxxxx Indicates Distance to Berm : 297 Observations
— Indicates Distance to Vegetation Line : 297 Observations



Five Day Moving Average

No. of Observations : 297



BEACH PROFILE PARAMETERS - 1987

COPE
Buddina Beach
Figure
31

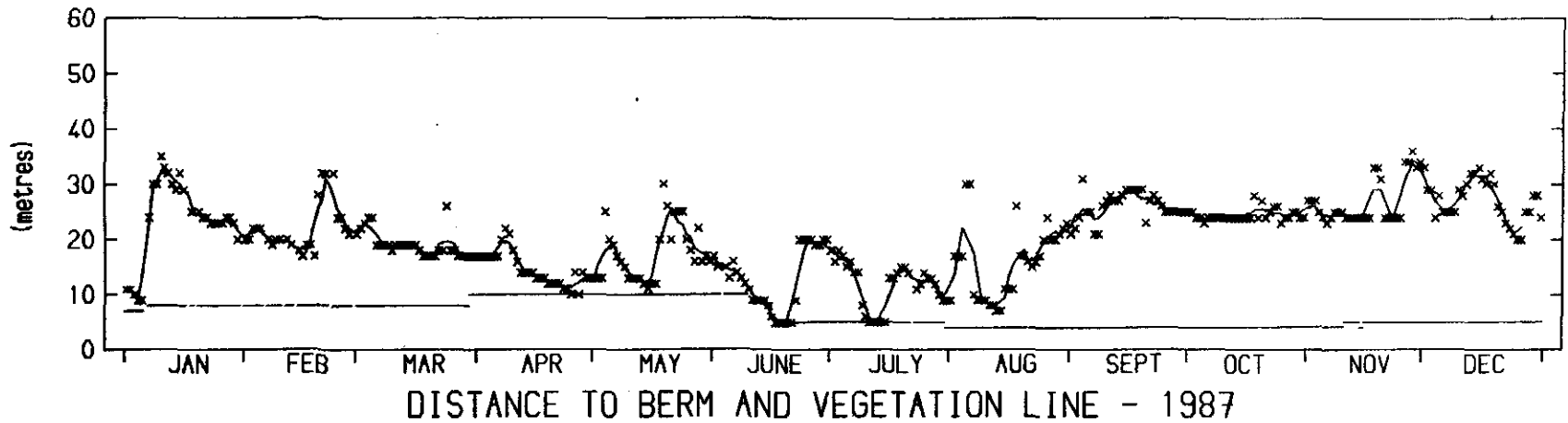
C 28.1

COPE - Coastal Observation
Programme Engineering

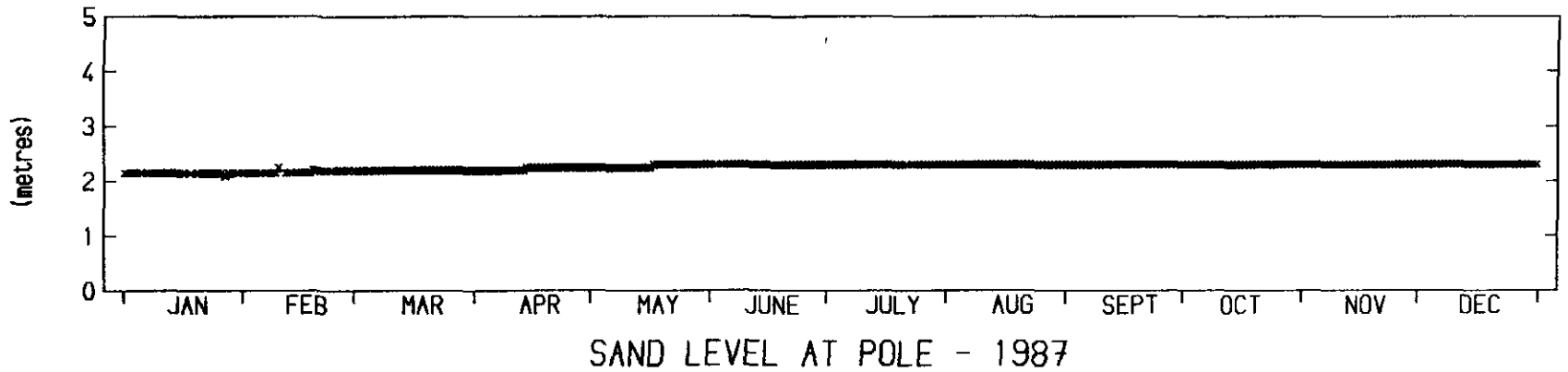
CALOUNDRA CITY

BUDDINA BEACH

0603



xxxxx Indicates Distance to Berm : 355 Observations
— Indicates Distance to Vegetation Line : 355 Observations



Five Day Moving Average

No. of Observations : 355



BEACH PROFILE PARAMETERS - 1988

COPE

Buddina Beach

Figure

32

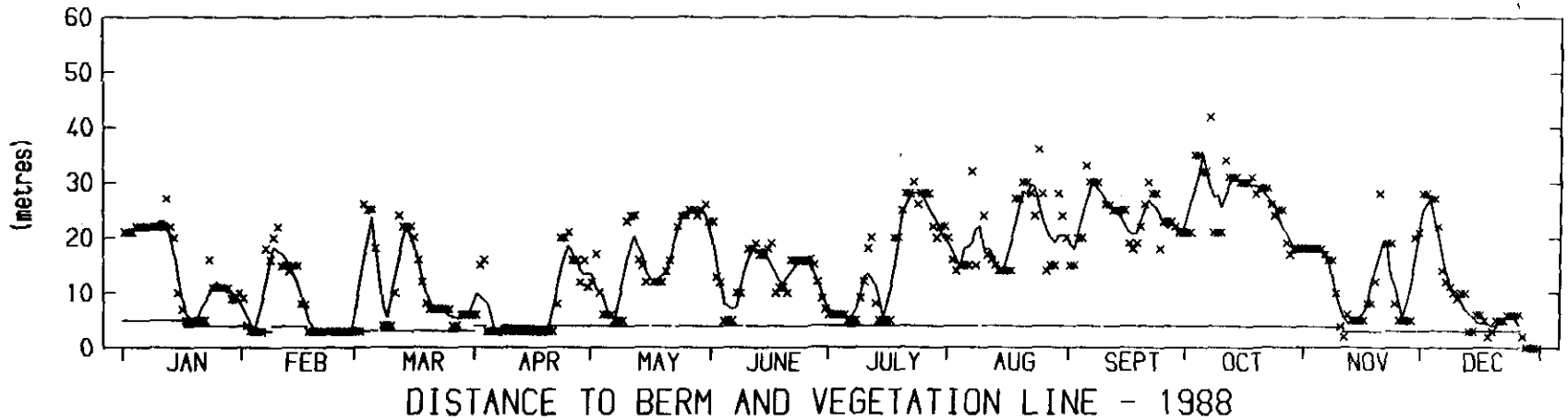
C 28.1

COPE - Coastal Observation
Programme Engineering

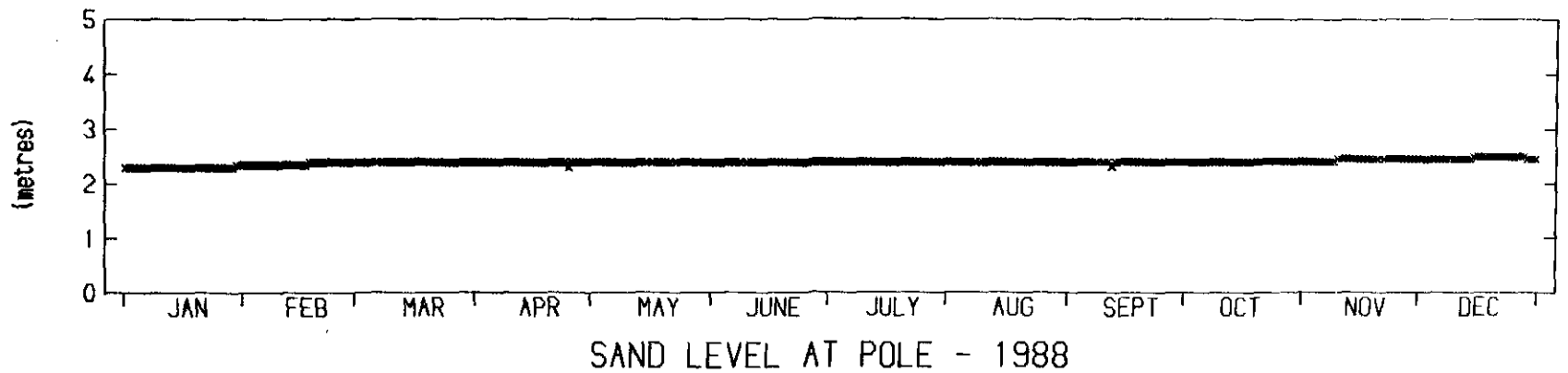
CALOUNDRA CITY

BUDDINA BEACH

0603



xxxxx Indicates Distance to Berm : 359 Observations
— Indicates Distance to Vegetation Line : 359 Observations



Five Day Moving Average

No. of Observations : 359



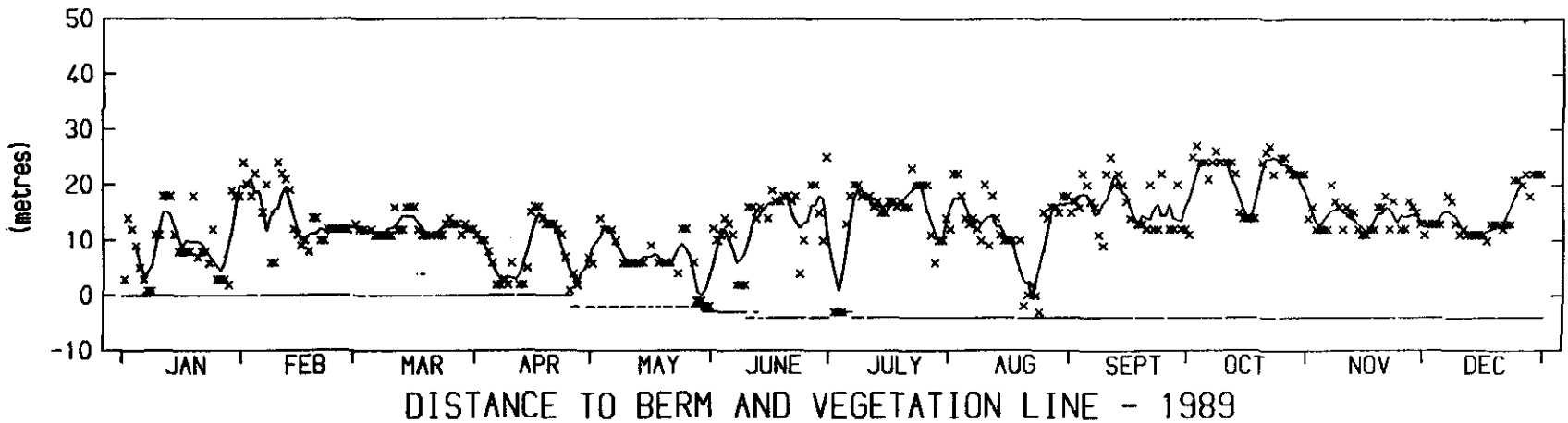
BEACH PROFILE PARAMETERS - 1989

COPE - Coastal Observation
Programme Engineering

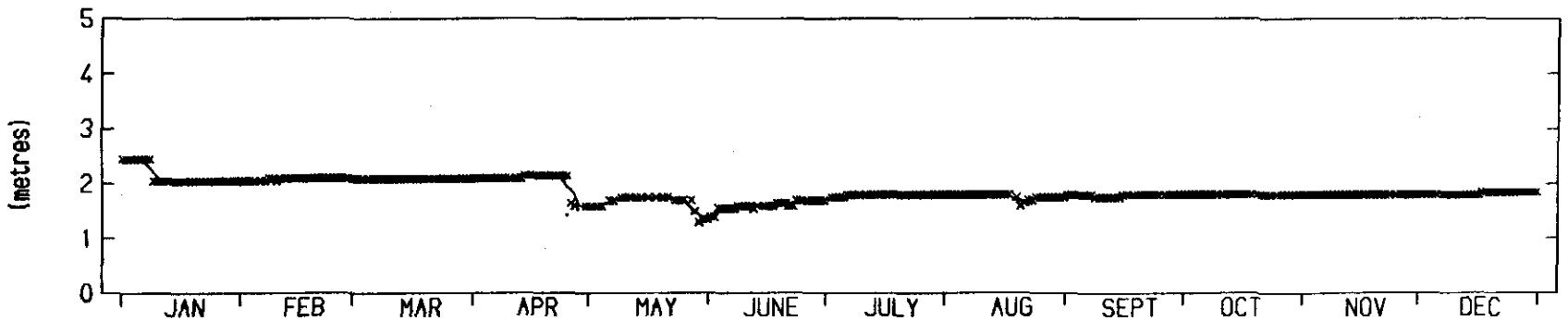
CALOUNDRA CITY

BUDDINA BEACH

0603



xxxxx Indicates Distance to Berm : 338 Observations
— Indicates Distance to Vegetation Line : 338 Observations



Five Day Moving Average

No. of Observations : 338

COPE
Buddina Beach
Figure
33
C 28.1



BEACH PROFILE PARAMETERS - 1990

COPE
Buddina Beach

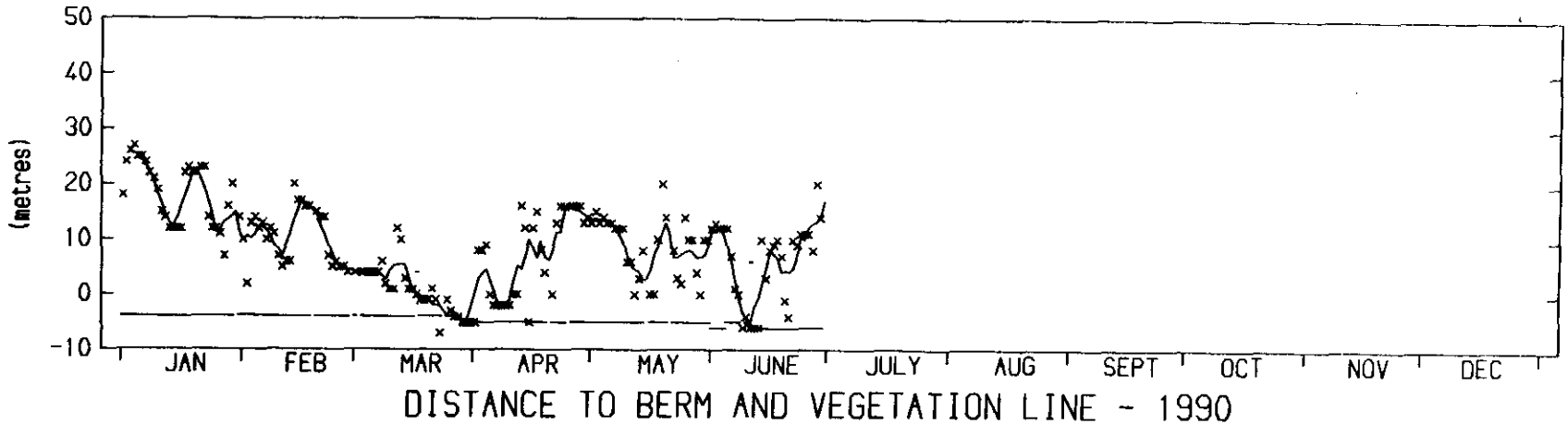
Figure
34
C 28.1

COPE - Coastal Observation
Programme Engineering

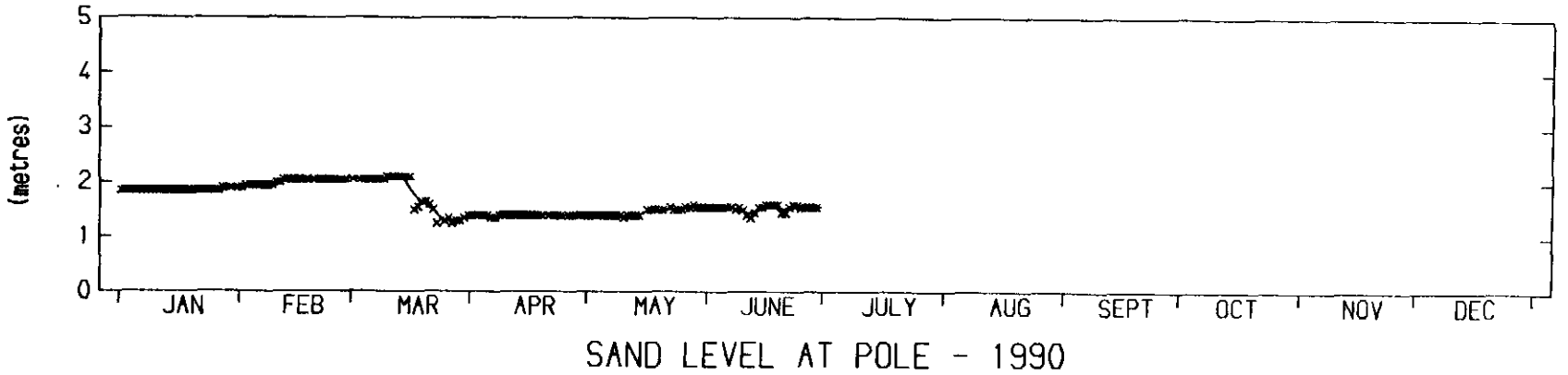
CALOUNDRA CITY

BUDDINA BEACH

0603

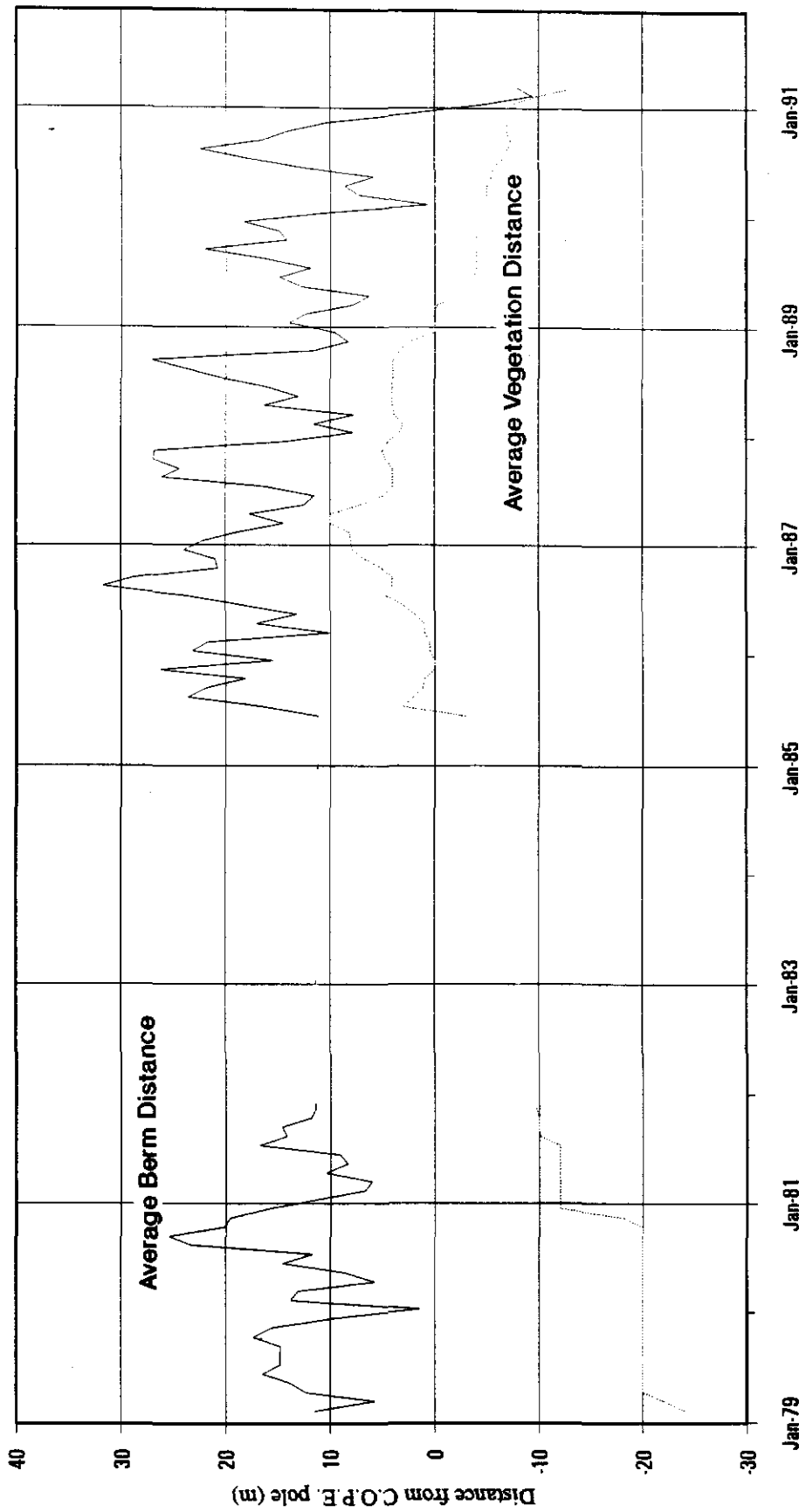


xxxxx Indicates Distance to Berm : 172 Observations
— Indicates Distance to Vegetation Line : 172 Observations



Five Day Moving Average

No. of Observations : 172



Beach Protection Authority
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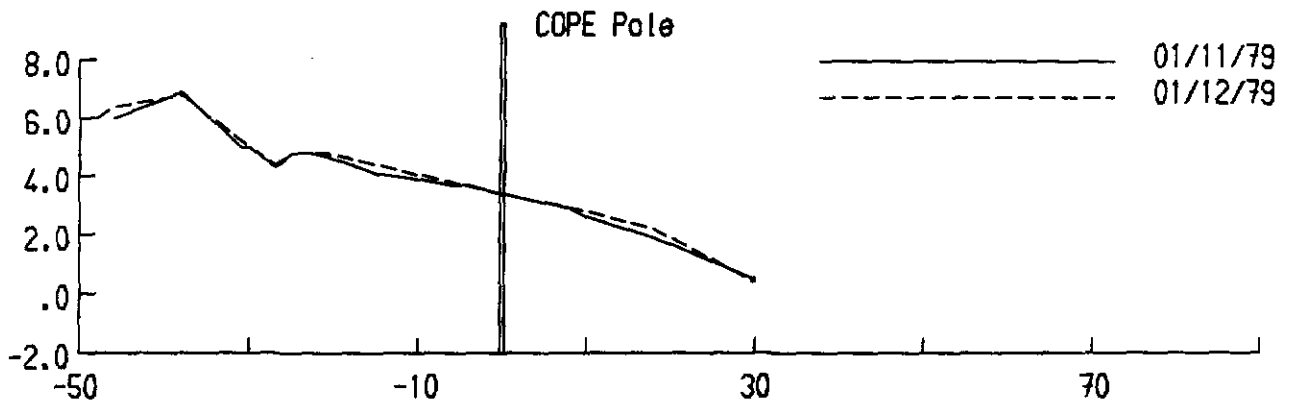
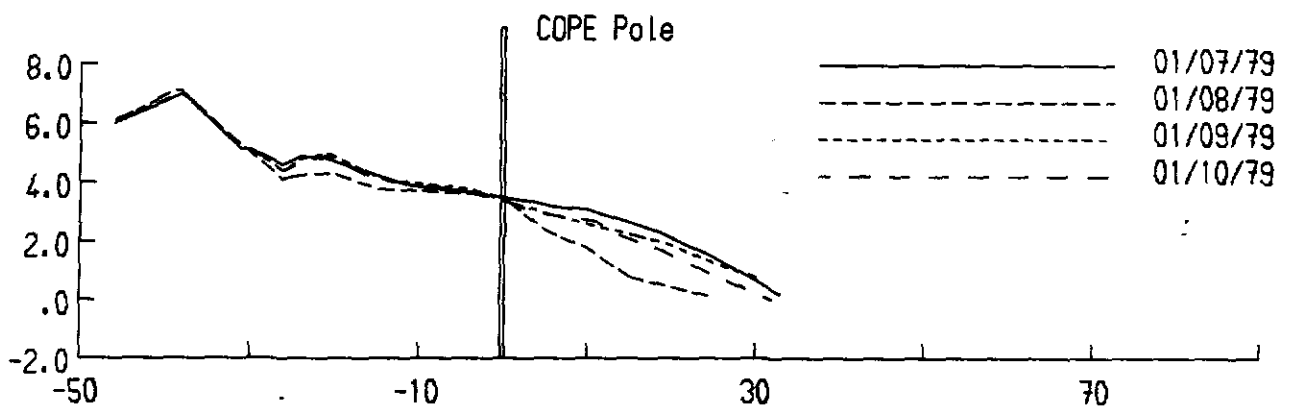
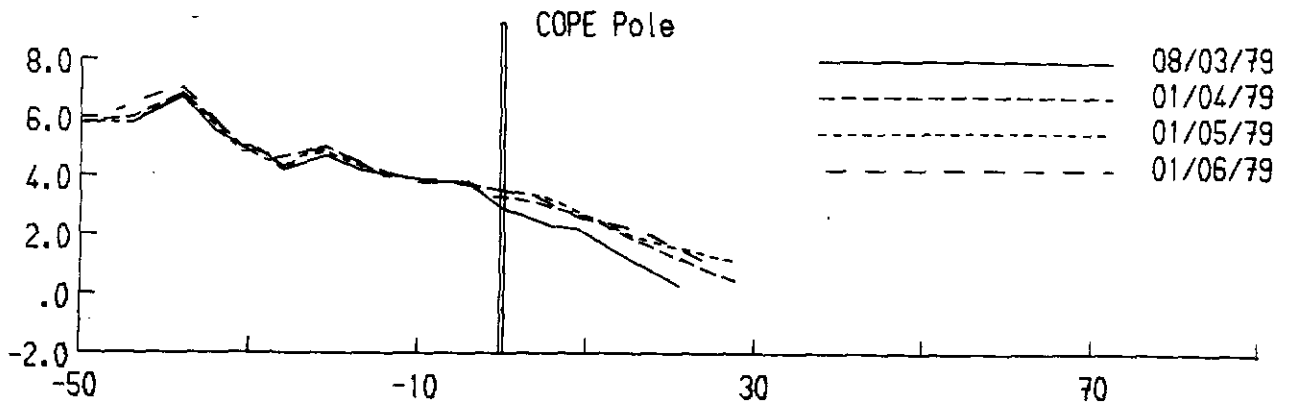
MARCH 1979 - APRIL 1991

COPE
Buddina Beach

Figure

35

C 28.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



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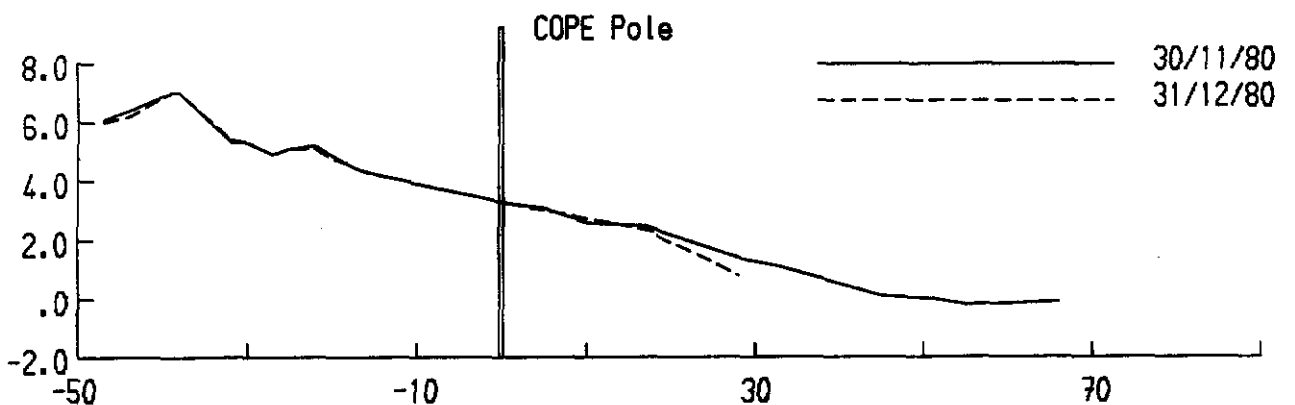
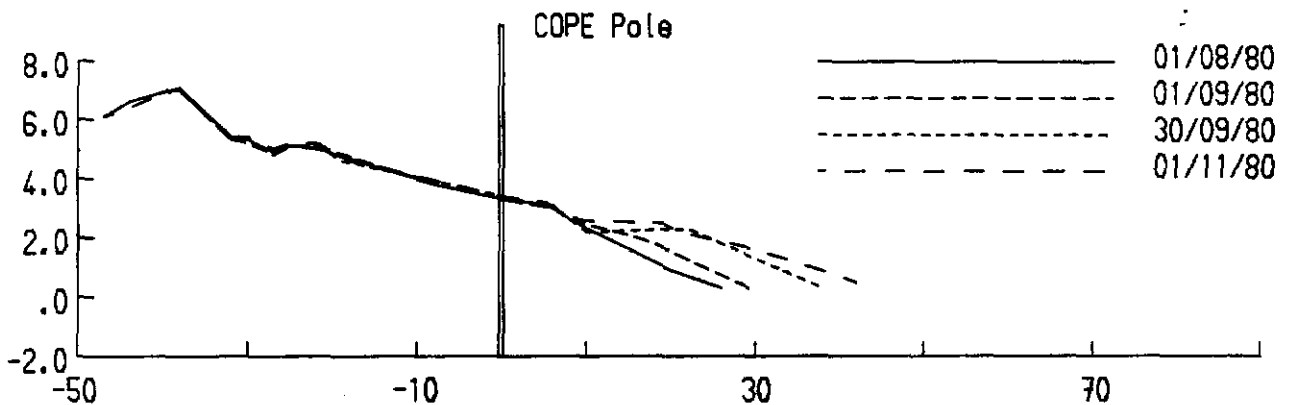
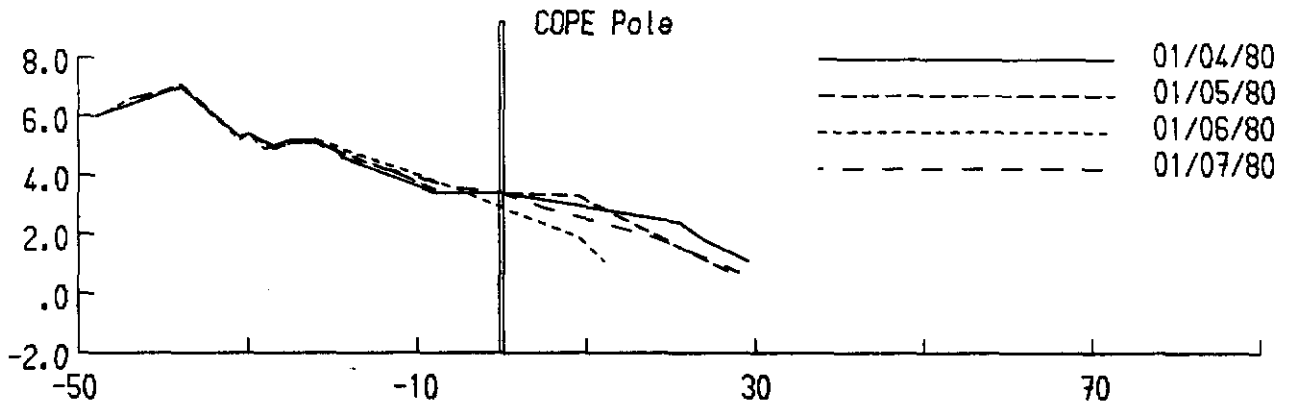
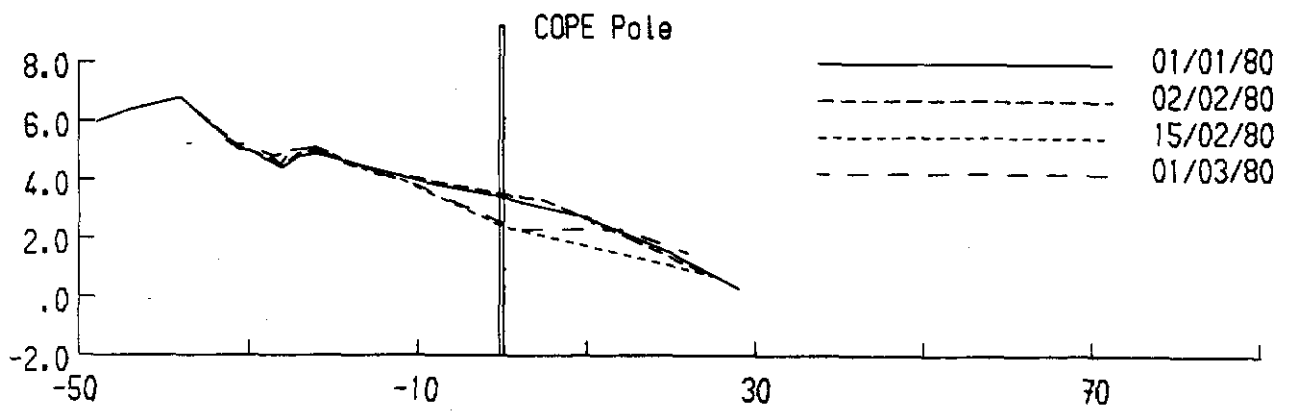
MONTHLY BEACH PROFILES - 1979

COPE
Buddina Beach

Figure

36

C 28.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



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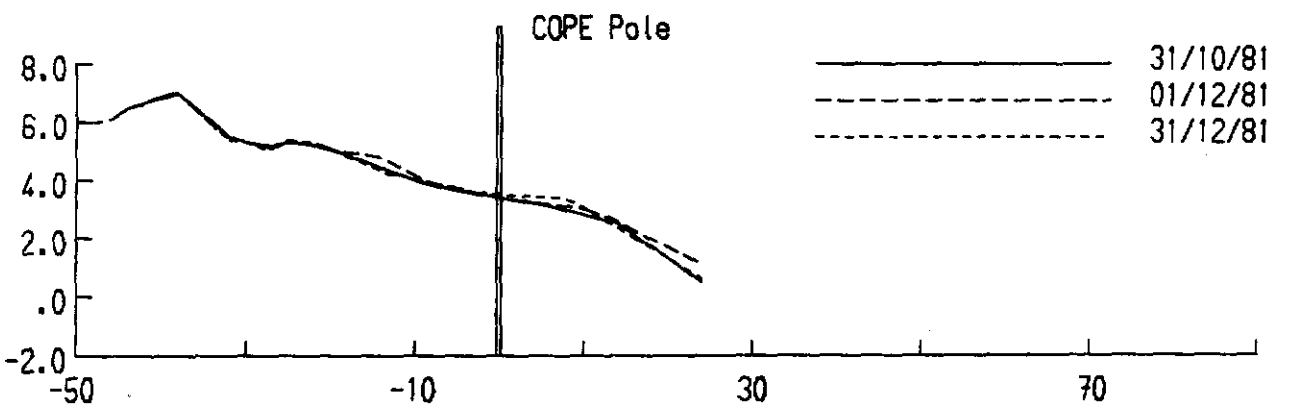
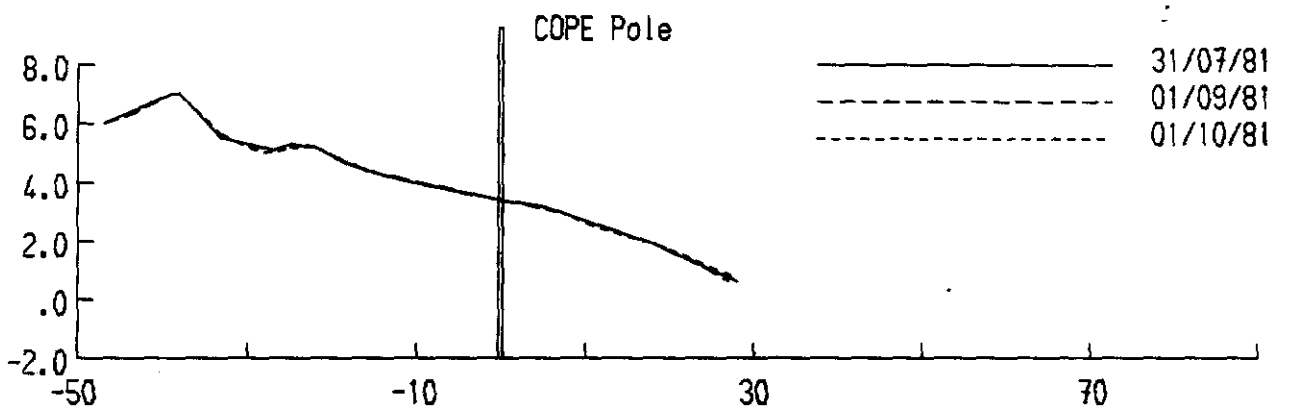
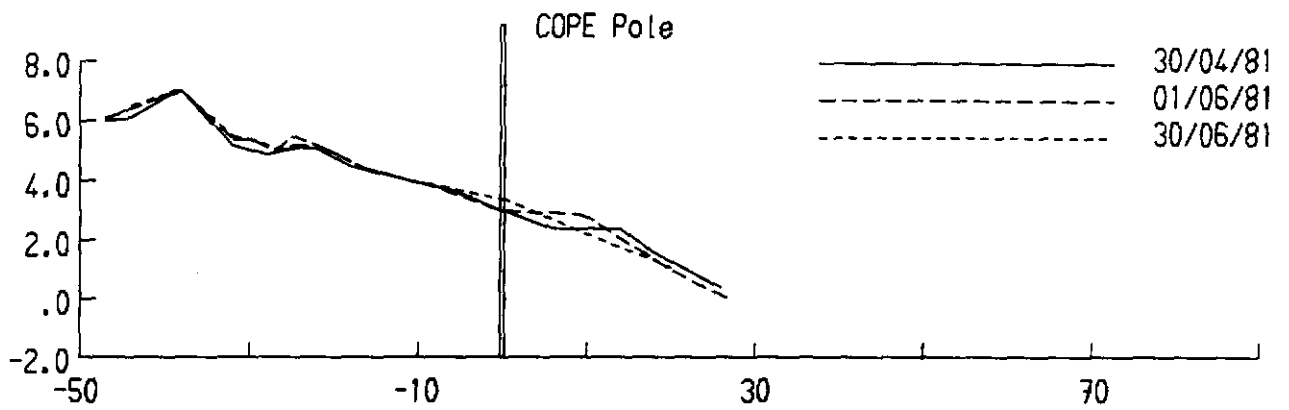
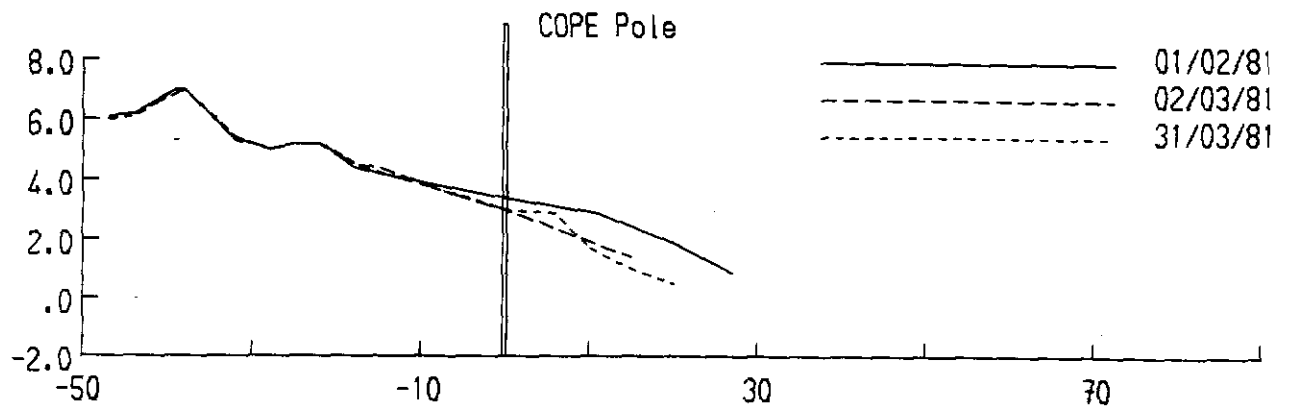
MONTHLY BEACH PROFILES - 1980

COPE
Buddina Beach

Figure

37

C 28.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



Beach Protection Authority
Queensland

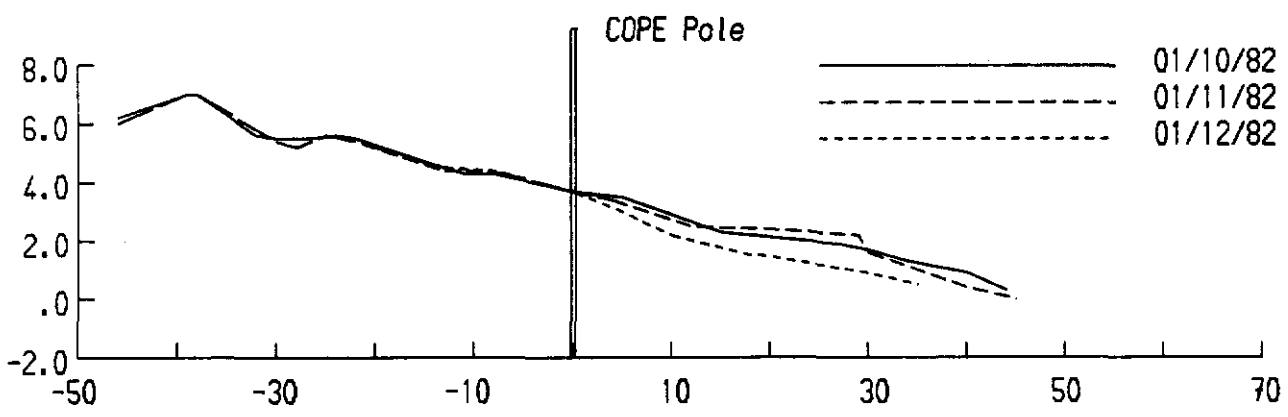
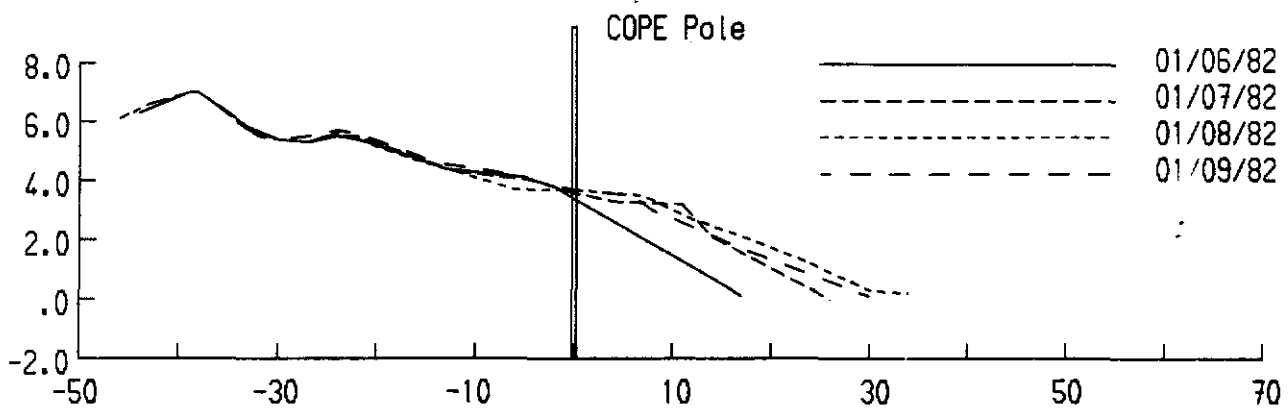
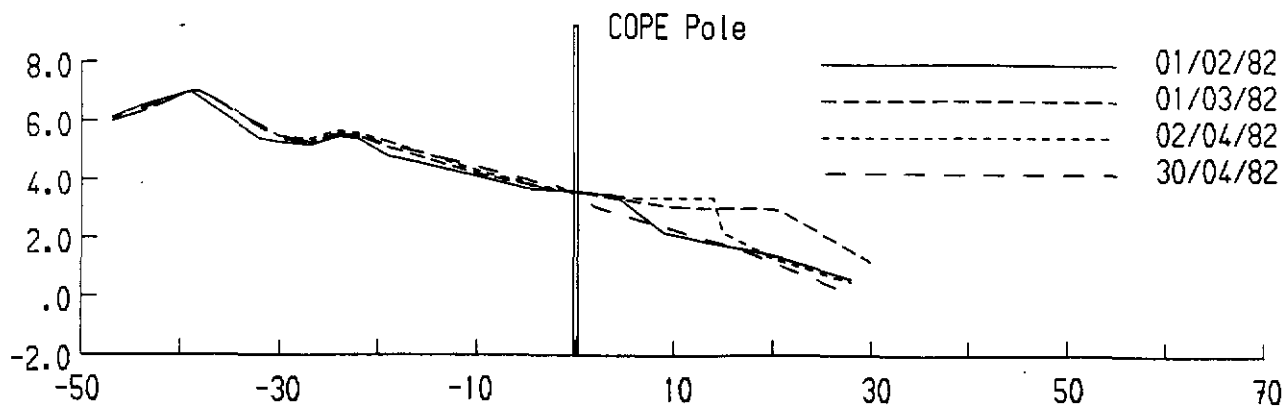
MONTHLY BEACH PROFILES - 1981

COPE
Buddina Beach

Figure

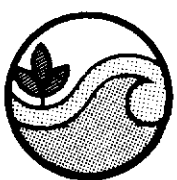
38

C 28.1



Level Datum is A.H.D.

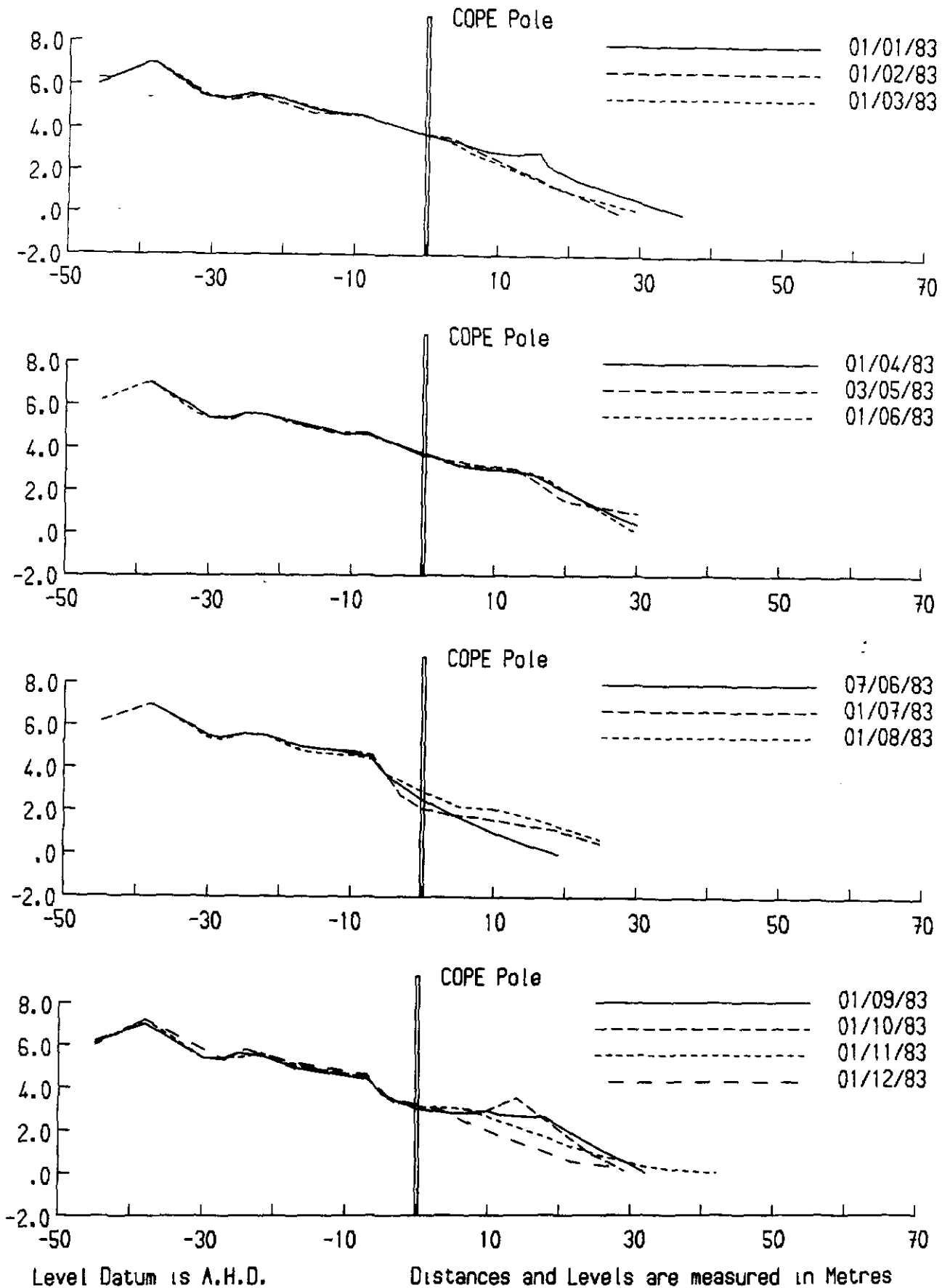
Distances and Levels are measured in Metres



Beach Protection Authority
Queensland

MONTHLY BEACH PROFILES - 1982

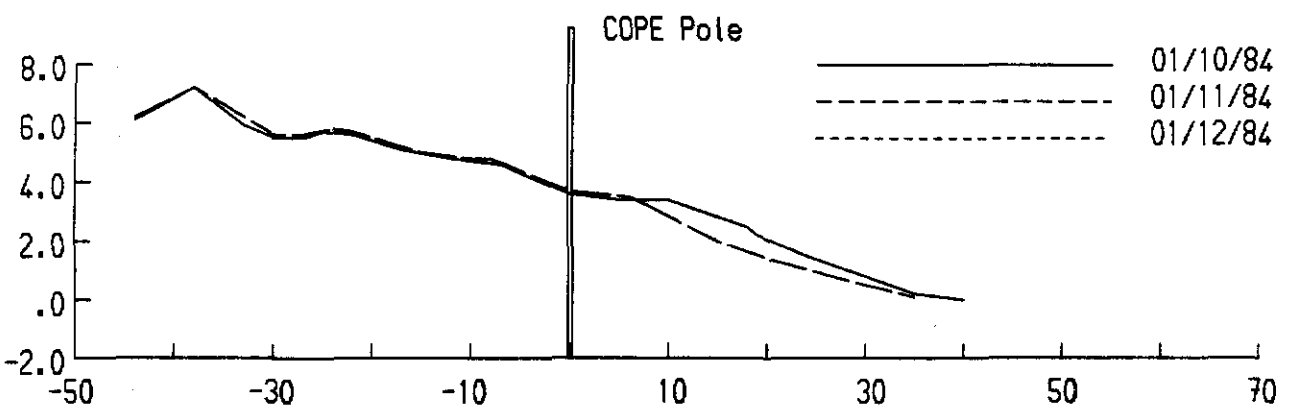
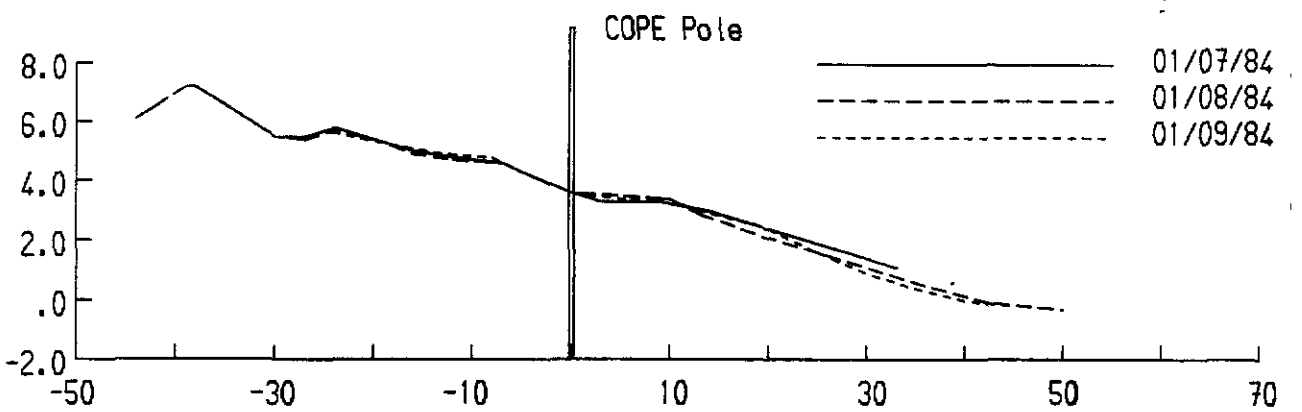
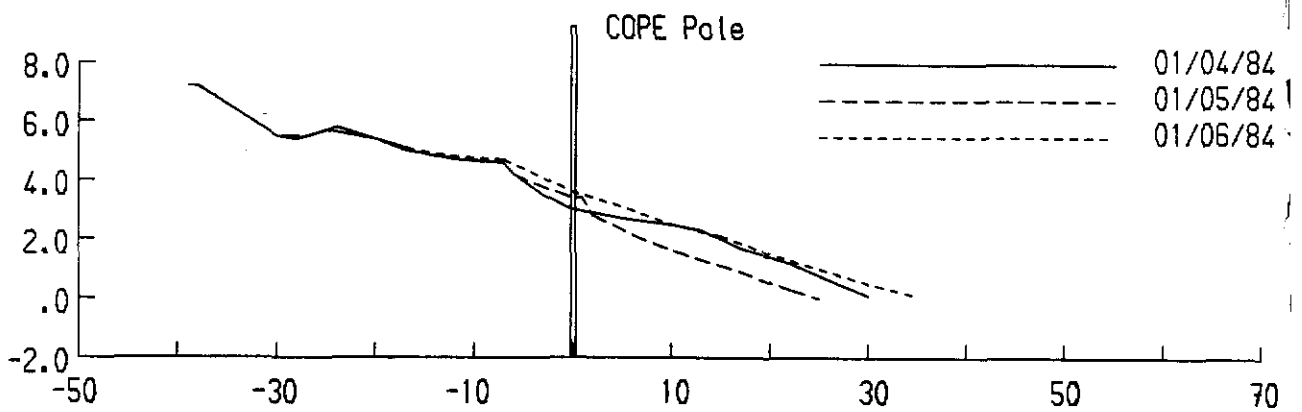
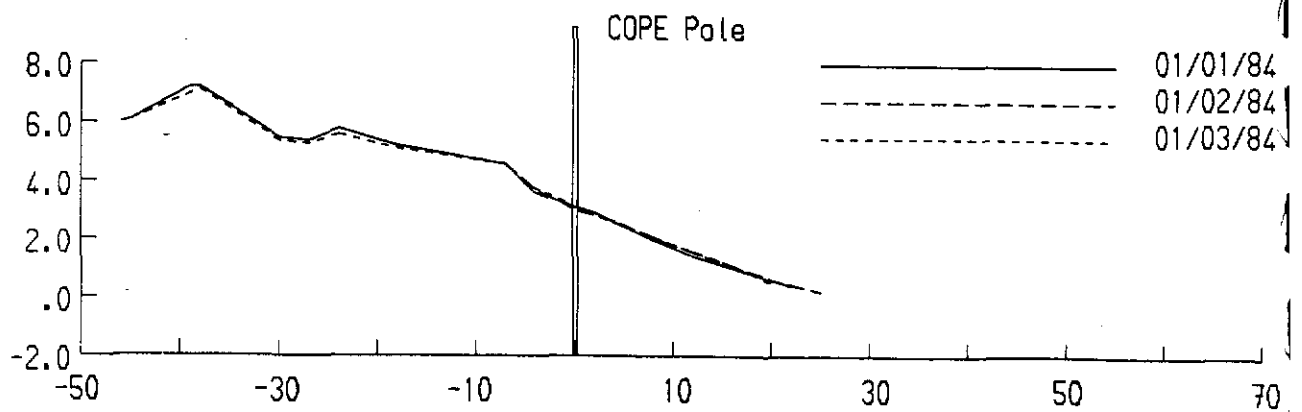
COPE
Buddina Beach
Figure
39
C 28.1



Beach Protection Authority
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MONTHLY BEACH PROFILES - 1983

COPE
Buddina Beach
Figure
40
C 28.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



Beach Protection Authority
Queensland

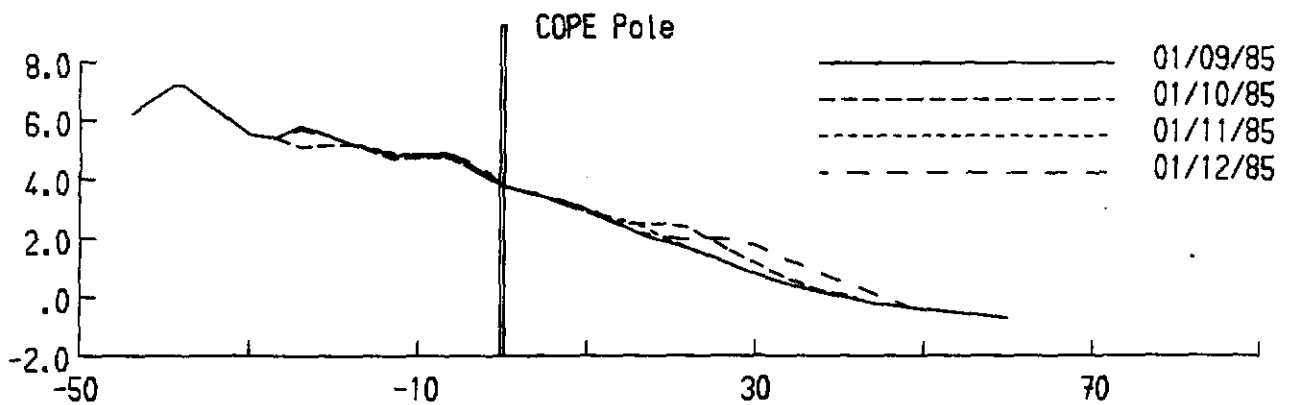
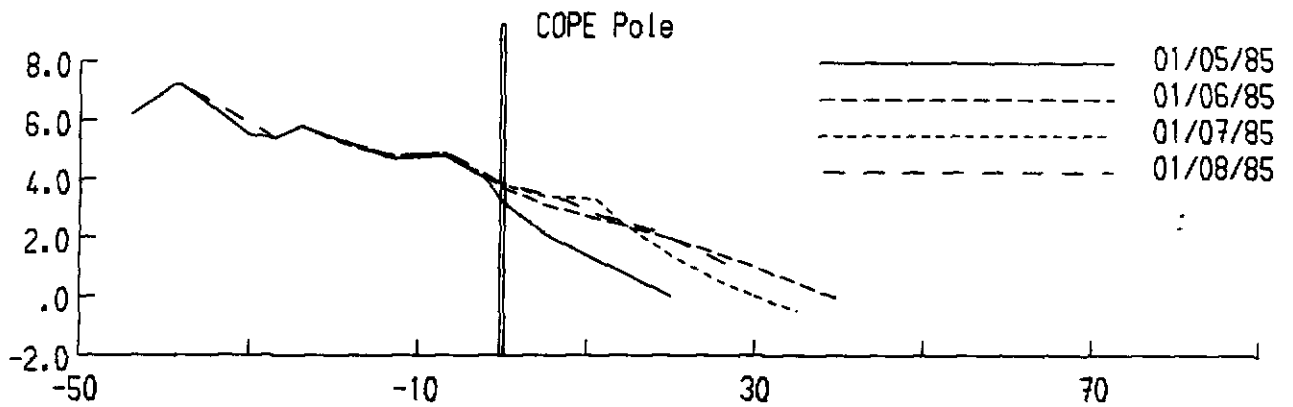
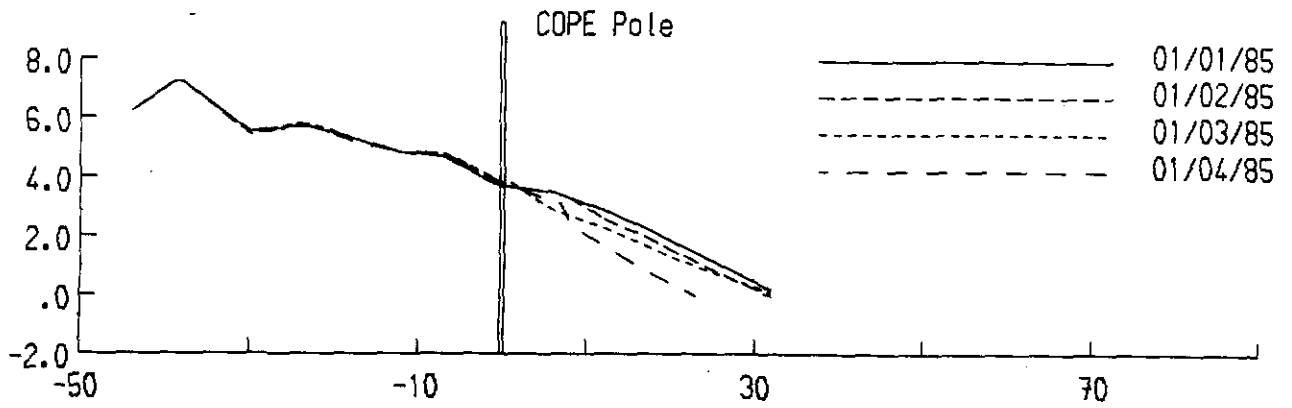
MONTHLY BEACH PROFILES - 1984

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Buddina Beach

Figure

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C 28.1



Level Datum is A.H.D.

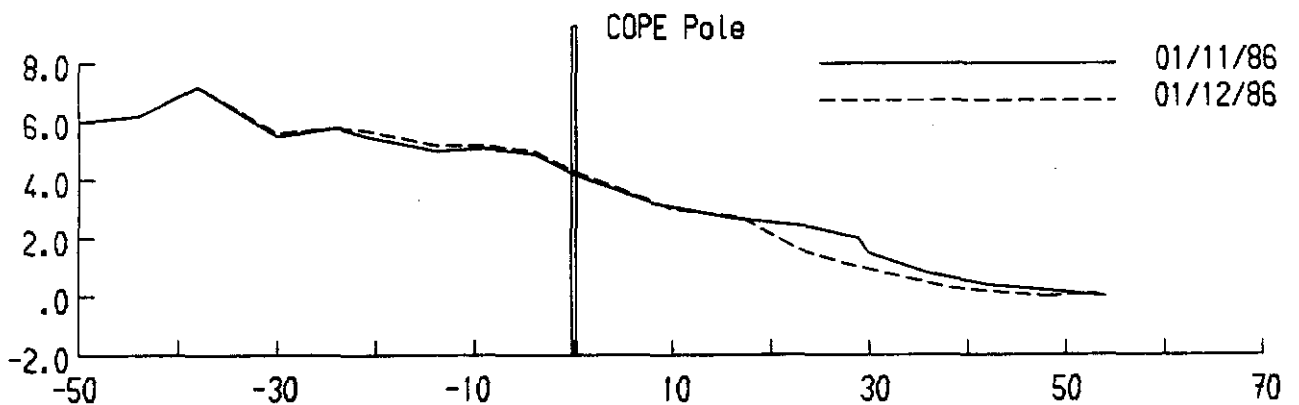
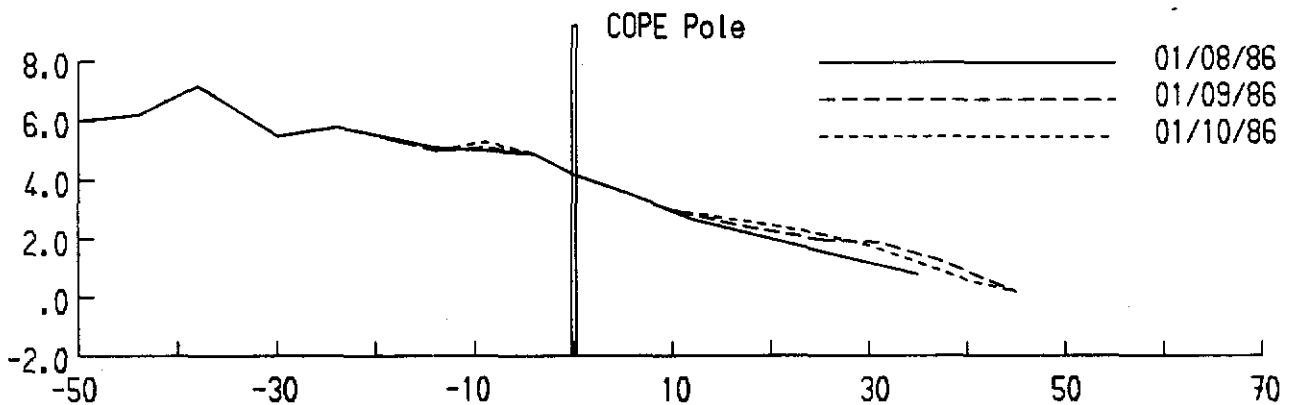
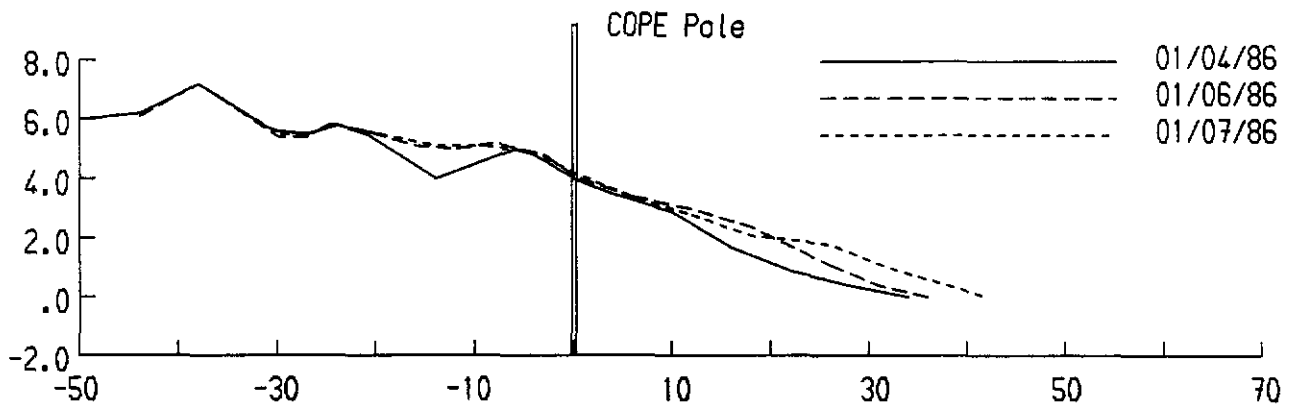
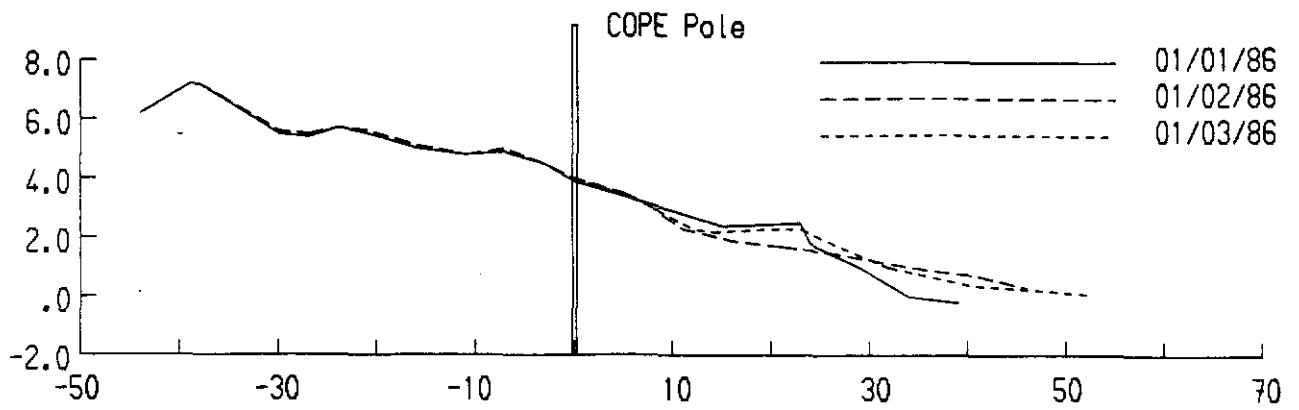
Distances and Levels are measured in Metres



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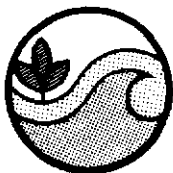
MONTHLY BEACH PROFILES - 1985

COPE
Buddina Beach
Figure
42
C 28.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



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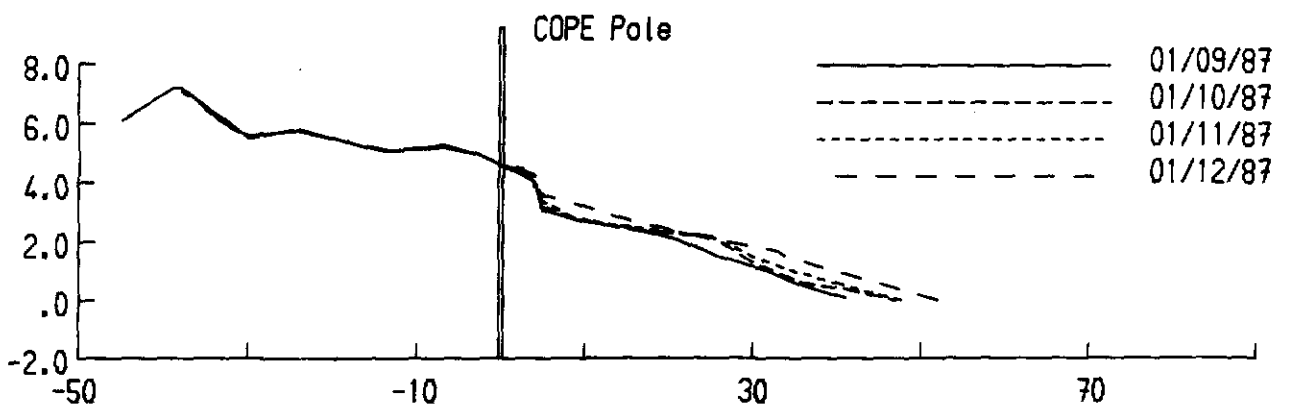
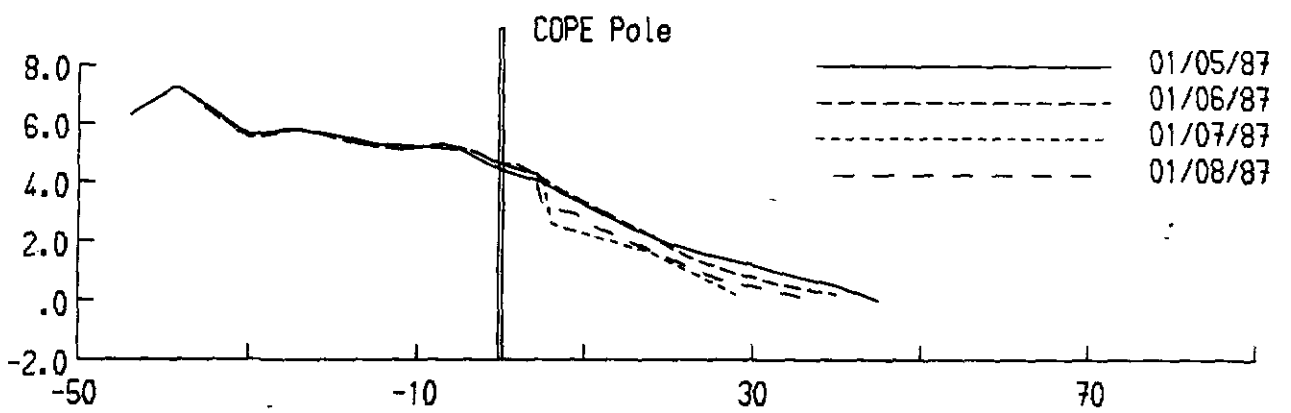
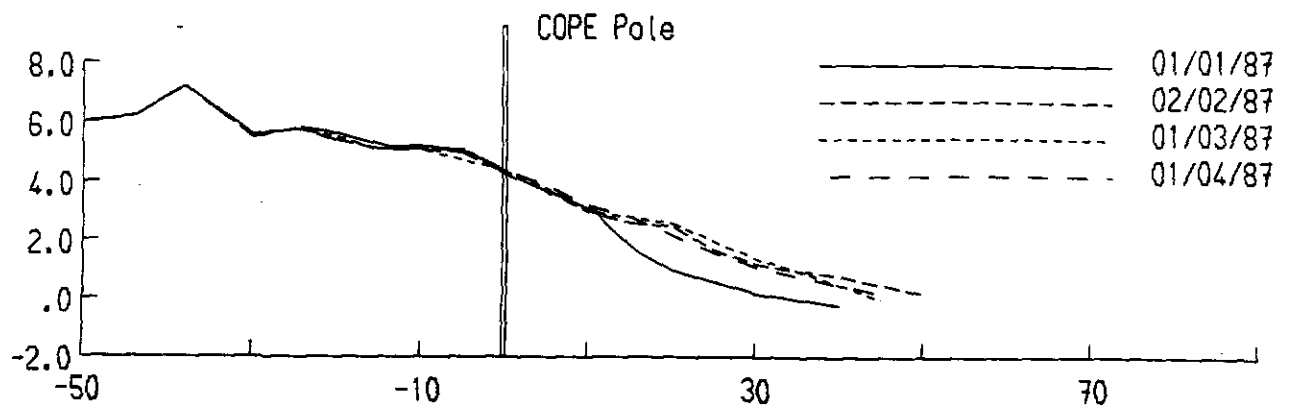
MONTHLY BEACH PROFILES - 1986

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Buddina Beach

Figure

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C 28.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



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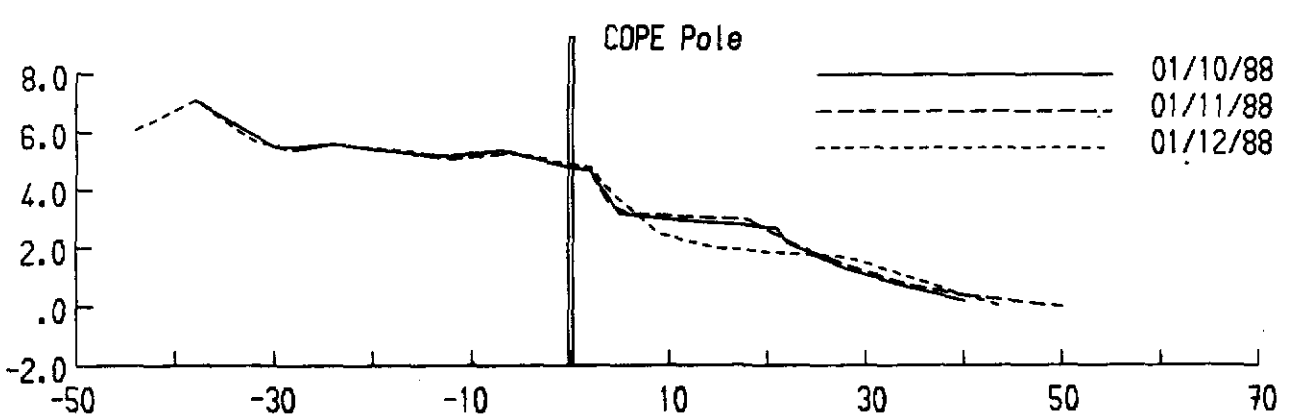
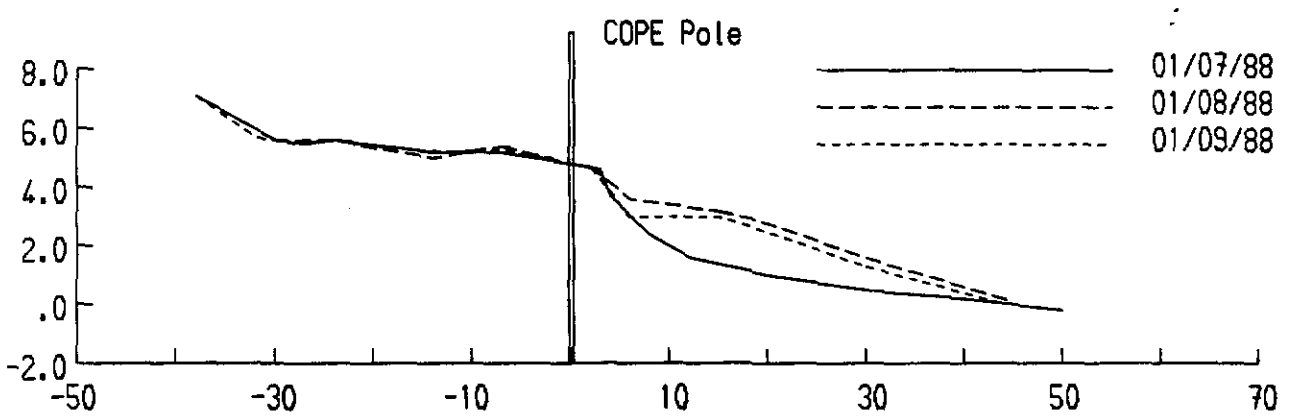
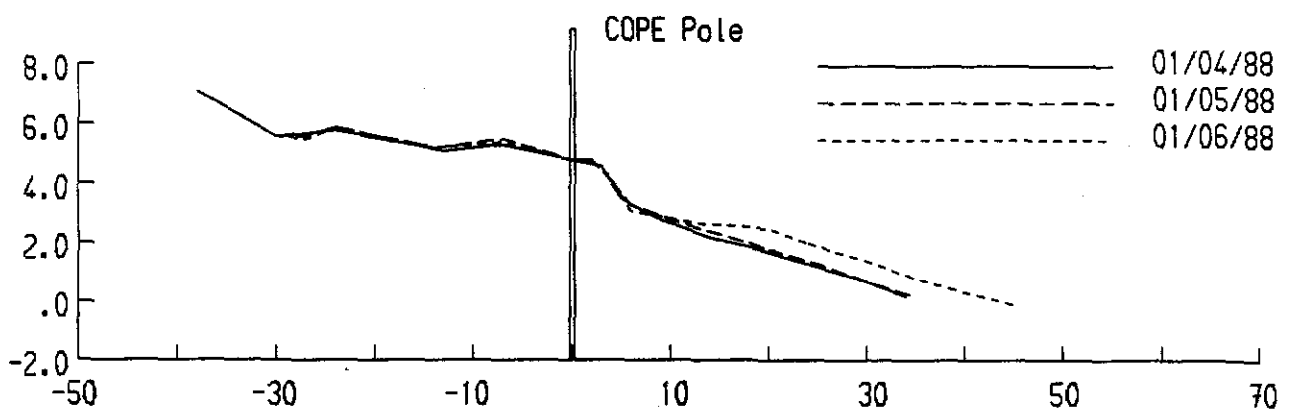
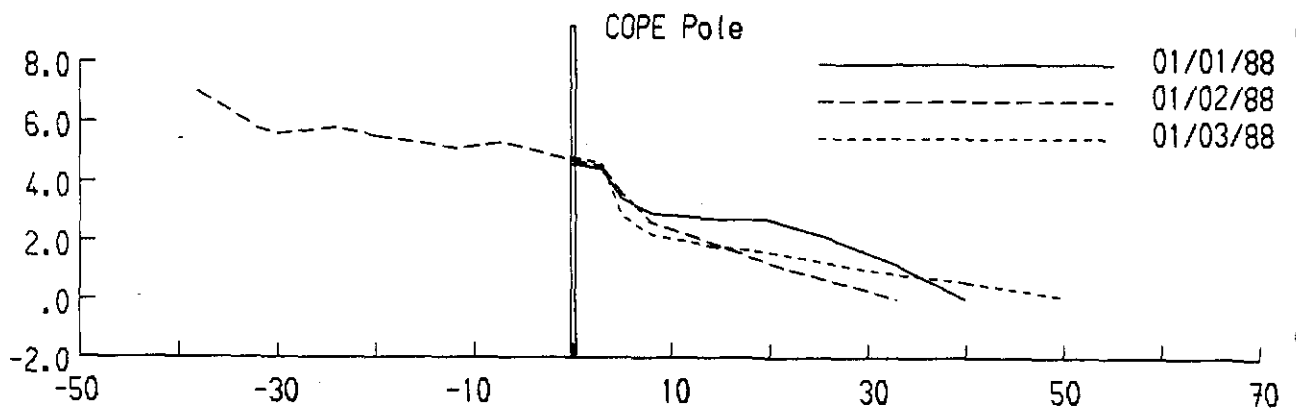
MONTHLY BEACH PROFILES - 1987

COPE
Buddina Beach

Figure

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C 28.1



Level Datum is A.H.D.

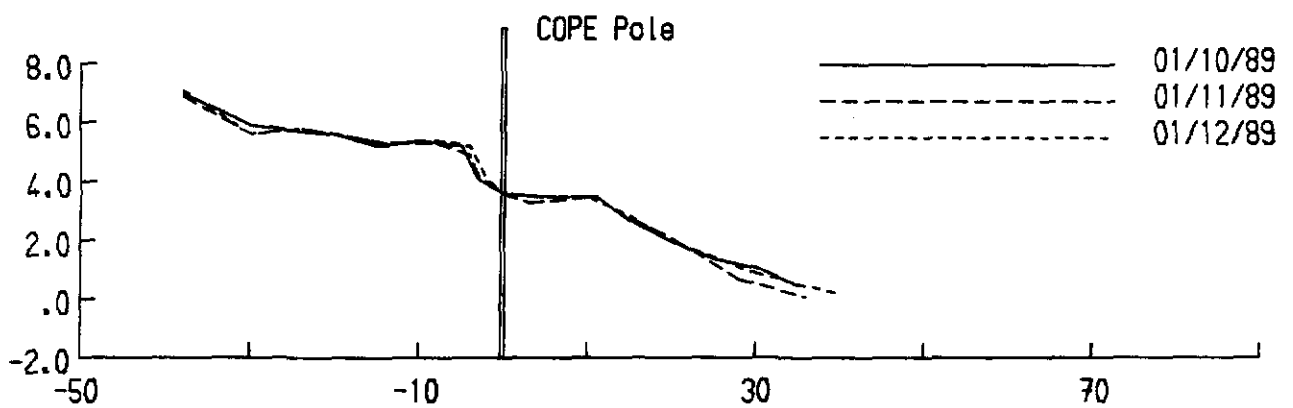
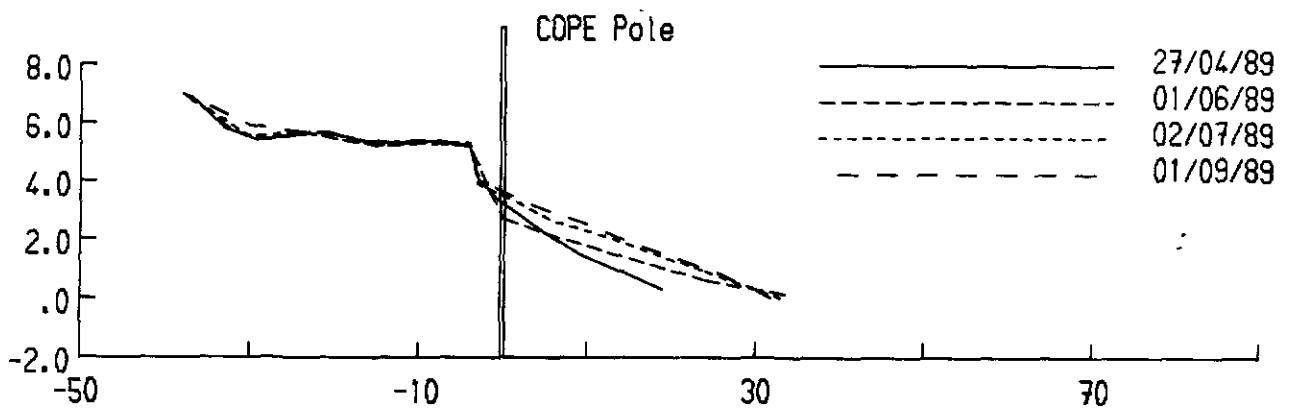
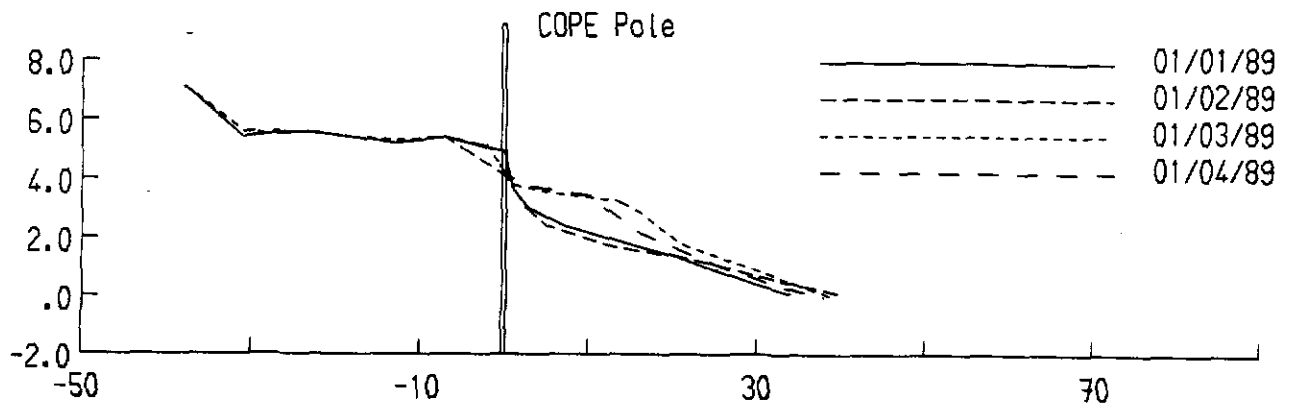
Distances and Levels are measured in Metres



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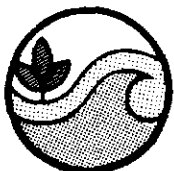
MONTHLY BEACH PROFILES - 1988

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Buddina Beach
Figure
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C 28.1



Level Datum is A.H.D.

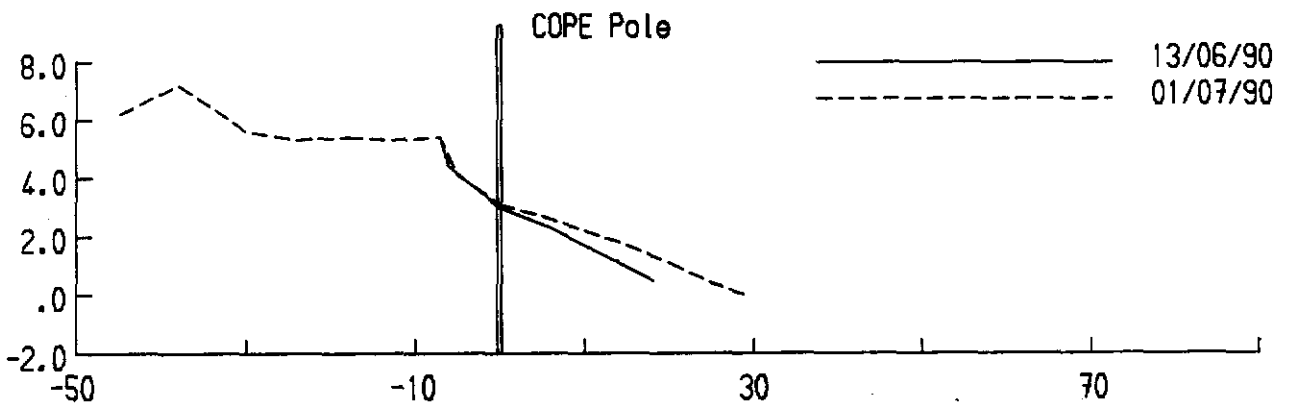
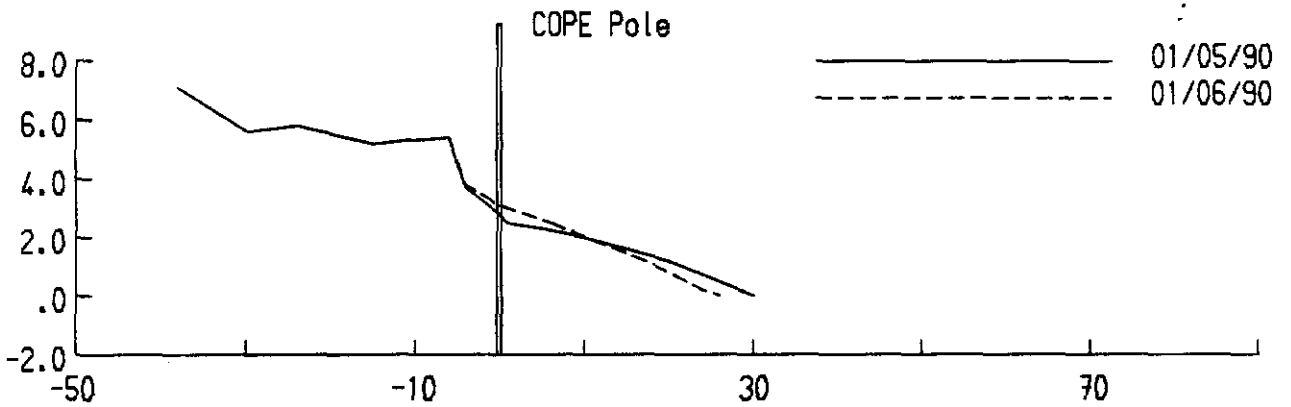
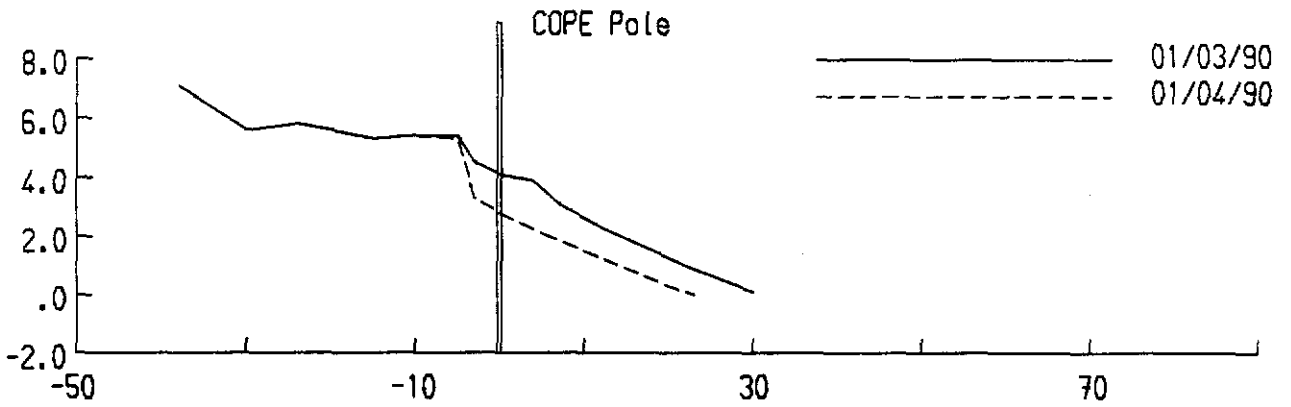
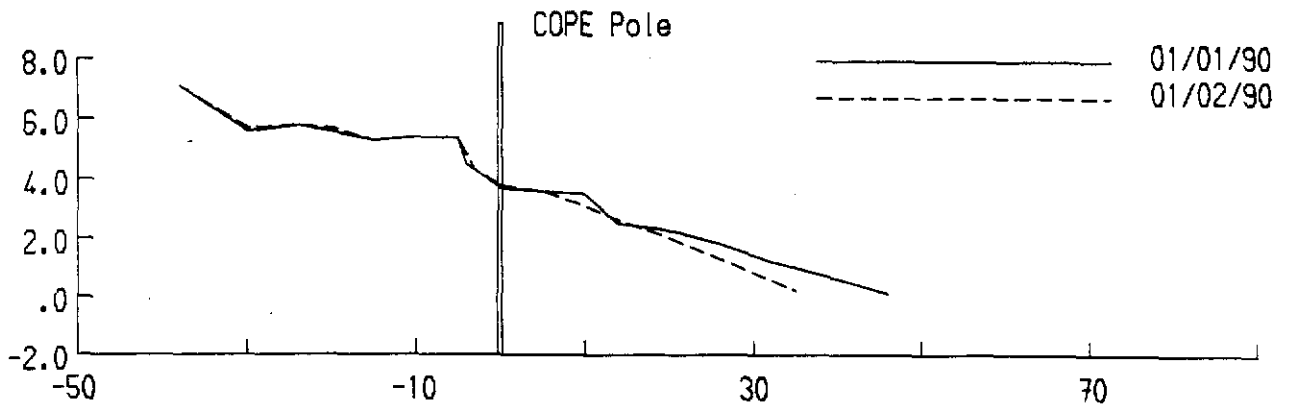
Distances and Levels are measured in Metres



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MONTHLY BEACH PROFILES - 1989

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Buddina Beach
Figure
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C 28.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



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MONTHLY BEACH PROFILES - 1990

COPE
Buddina Beach

Figure

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C 28.1