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ENVIRONMENTAL, MORPHOLOGICAL AND SEDIMENT SIZE DATA FROM TWO BARRIER BEACHES IN THE MAGDALEN ISLANDS, QUEBEC

by

E.H. Owens and D.H. Frobel

Atlantic Geoscience Centre
Geological Survey of Canada
Department of Energy, Mines and Resources

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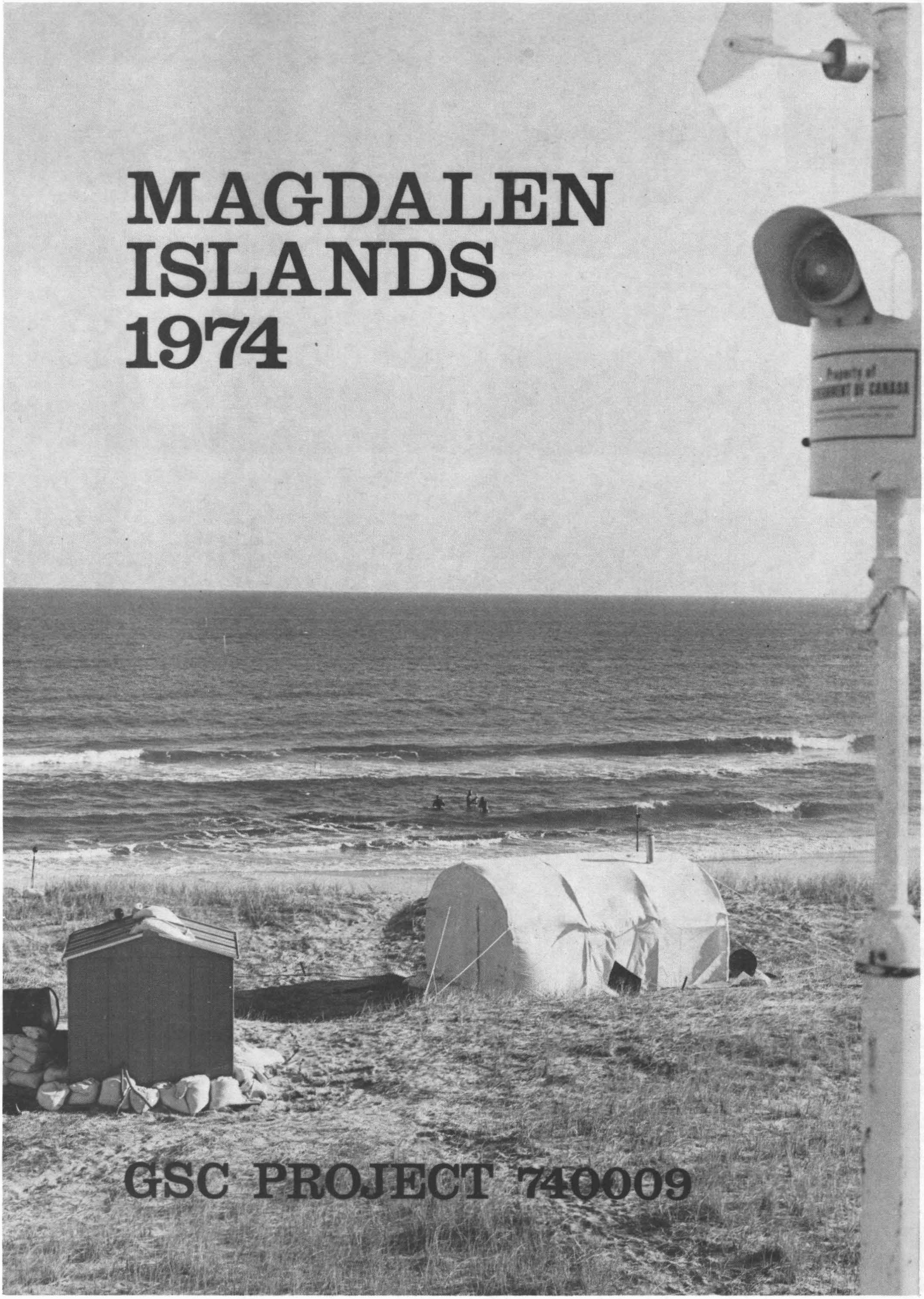
ABSTRACT

Two barrier beach sites in the Magdalen Islands, Quebec, were occupied for a 28-day period in July-August 1974 and a 19-day period in November 1974 to monitor a time-series of beach and nearshore processes and to map the morphology of the beach and nearshore zones. This report presents the original and reduced data on environmental parameters, computed values of wave power, computed rates of longshore sediment transport, beach profiles and morphology maps, nearshore profiles and topography maps, and sediment size analyses.

SOMMAIRE

Deux cordons littoraux des îles de la Madeleine, au Québec, ont été occupés pendant une période de 28 jours, en juillet et août 1974, et une période de 19 jours, en novembre 1974, en vue d'observer une série chronologique de phénomènes propres à la plage et à l'arrière-plage et d'établir la carte morphologique de ces zones. On trouvera dans le présent rapport les données initiales et simplifiées concernant les paramètres du milieu, la valeur calculée de la force des vagues, les vitesses calculées de transport des sédiments littoraux, les profils et les cartes morphologiques de la plage, les profils et les cartes topographiques de l'arrière-plage, ainsi que des études de la taille des particules de sédiments.

MAGDALEN ISLANDS 1974



GSC PROJECT 740009

CONTENTS*

* Note: A more detailed list of contents and a list of figures, photographs and tables is given at the start of each section.

PART 1

INTRODUCTION

CONTENTS

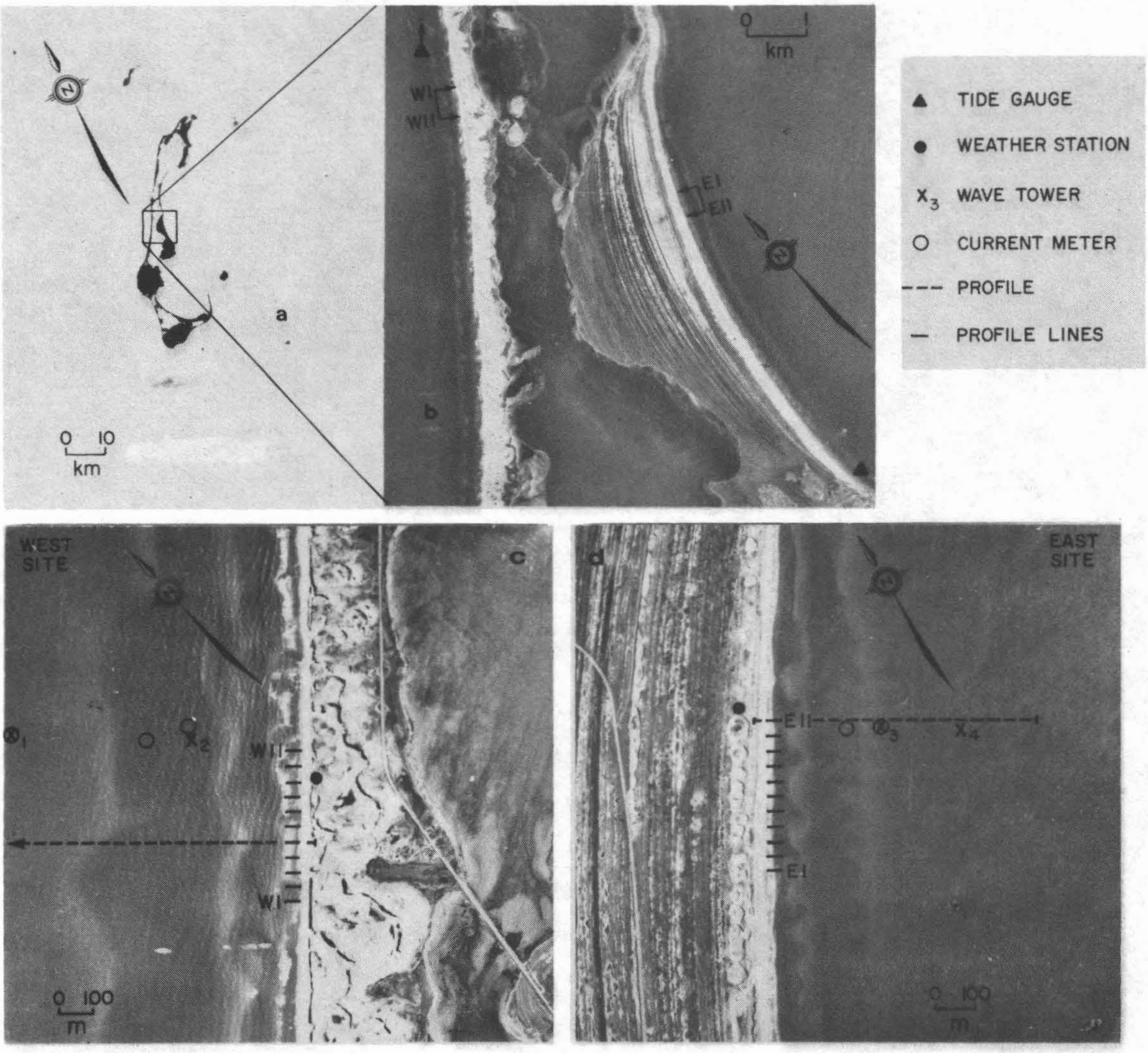
OBJECTIVES:

Data were collected simultaneously at two sites on the barrier beaches of the Magdalen Islands in the Gulf of St. Lawrence (Fig. 1.1, Photo 1.1, 1.2) to obtain a time-series of process variables and to monitor geomorphological changes between July 30 to August 27 and November 12 to 30, 1974. The objectives were to (1) investigate the relationships between littoral processes, sediment dynamics, and morphological variations, (2) compare west- and east-facing barrier beach environments, and (3) determine seasonal variations of process and morphology. A description of the data collection and reduction techniques is presented in each section.

These data were collected during GSC Project 740009 which was designed to provide detailed information subsequent to reconnaissance work in the southern Gulf (Owens and Harper, 1972; Owens, 1974a, b, 1975a, b, c, d).

ACKNOWLEDGEMENTS:

Considerable assistance in data reduction was provided by Gordon Joice, Andy Sherin and Roy Sparkes of the Atlantic Geoscience Centre. Size analysis of the sediment samples was carried out by Hugh Munroe, Department of Geology, Dalhousie University.



a. Magdalen Islands (National Air Photo Library, ERTS image, E-1395-14244-7, 22-8-73; 1: 1,000,000).

b. Study Area (National Air Photo Library, A13477-52, 1952; 1:60,000). Limits of the study sites indicated by the arrows.

c. West Coast Site (National Air Photo Library, A21672-108, 14-6-70; 1:9,500).

d. East Coast Site (National Air Photo Library, A21672-152, 14-6-70; 1:9,500).

Figure 1.1 Location of study sites.

Photo 1.1 West study site, view to the south at low tide on August 14, 1974. The limits of the study site are defined by the locations of the WI and WII profiles.

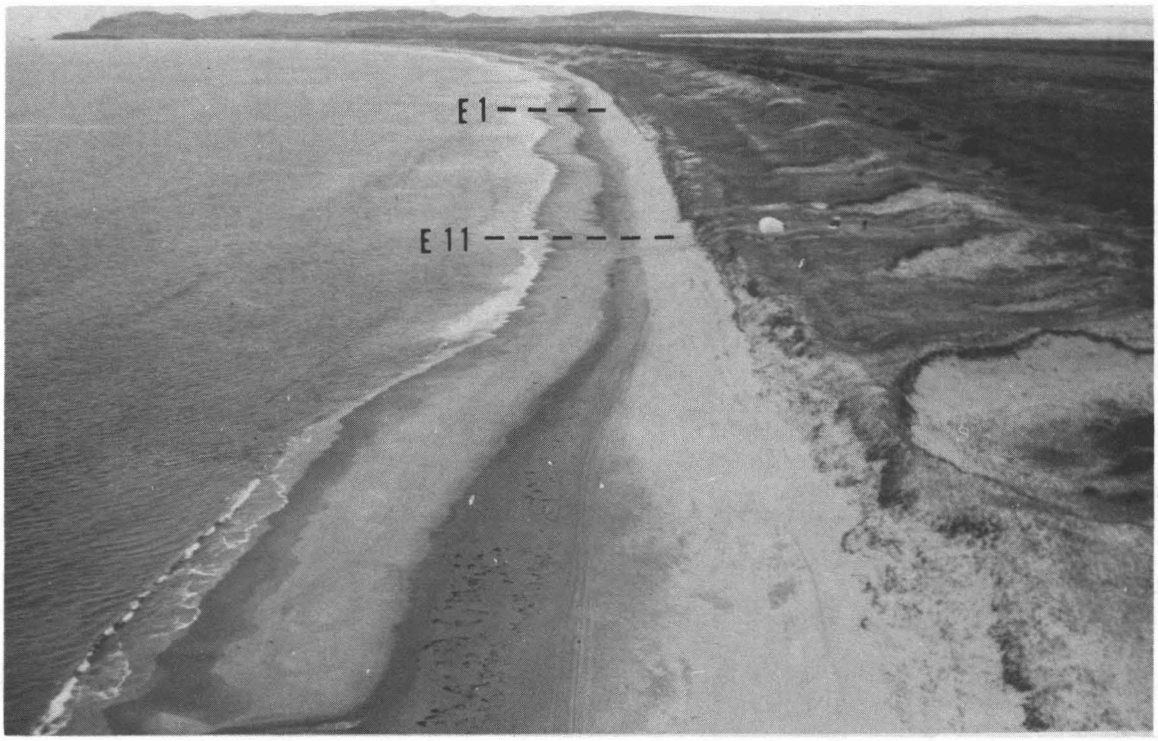


Photo 1.2 East study site, view to the south at low tide on November 11, 1974.

PART 2

ENVIRONMENTAL PARAMETERS

CONTENTS

At each site environmental parameters were monitored as a time-series every three hours during both summer and winter phases of the project. The per cent time of data recovery for each parameter is presented in Table 2.1. Where gaps in the data record are significant they are discussed below. The data are presented at the end of this section. Further details on the units of measurement are presented on pages 20 and 22 and a summary of the data is given in Table 2.2 (page 15).

Data Collection:

Monitoring at the west beach site continued from 0000 AST on July 30 to 1300 AST on August 24, 1974 and from 1200 AST on November 12 to 0900 AST on November 30, 1974. At the east beach site data were collected from 0430 AST on July 30 to 1330 AST on August 27, 1974 and from 1030 AST on November 12 to 1030 AST on November 30, 1974.

(a) Barometric Pressure: A chart-recording barometer was installed at an elevation of approximately 5 m above sea level. Time checks were made every six hours to ensure accurate time recording. During both phases barometric pressure recorded on this instrument was consistently 10 mb above that reported at the Grindstone meteorological station.

(b) Meteorological Parameters: An MRI Mechanical Weather Station (Model 1071) was installed at each beach site (Fig. 1.1c, 1.1d) on the crest of the foredune ridge approximately 2 m above the dune surface. Air temperature, wind run and wind direction were recorded on pressure sensitive paper at a chart speed of 10 mm/hr. To ensure accurate recording of data, time checks were made every three hours when weather conditions permitted. Air temperature was recorded to the nearest 0.5°C, wind run was in miles/hour and converted to km/hour, and wind direction was read to the nearest 5°. Rainfall was measured with a graduated plastic rain collector installed adjacent to each weather station. Sky condition values were related to the per cent cloud cover using the scale:

0	0% cloud cover
1	20% cloud cover
2	40% cloud cover
3	60% cloud cover
4	80% cloud cover
5	100% cloud cover
6	Fog

(c) Tide Data: Two water level transducers were installed, at Pointe au Loup, 5 km northeast of the west beach site, and at Dune du Sud 5 km southwest of the east beach site (Fig. 1.1b). These locations (both wharves) were the nearest suitable sites for this equipment. A major problem resulted from waves breaking over the wharves and water entering the chart-recorder housings. This led to the paper jamming and a subsequent loss of record. A second problem, at Dune du Sud during the winter phase, resulted from the burial of the transducer and subsequent loss of the chart house and recorder (the recorder was later retrieved by a fisherman). No usable data were collected from this gauge during the winter operations. On the basis of experience in the summer, when the Pointe au Loup gauge provided only a 50% time coverage due to water-logging of the chart recorder, a third gauge was installed at Fatima wharf, located 13 km southwest of the west beach site. This is a more sheltered location than

	JULY/AUGUST		NOVEMBER	
	West	East	West	East
Barometric Pressure	100%	100%	100%	100%
Air Temp.	100	100	95	94
Sky Condition	100	100	100	100
Wind Velocity	100	100	81	69
Wind Direction	100	100	95	94
Water Level	55	75	100	0
Groundwater Level 1	-	-	100	100
Groundwater Level 2	-	-	100	99
Groundwater Level 3	-	-	80	58
Rainfall	100	100	100	100
Offshore Wave Period	100	78	0	90
Offshore Wave Height	100	78	0	90
Nearshore Wave Period	89	93	100	100
Nearshore Wave Height	89	93	-	-
Breaker Ht.	100	100	100	100
Breaker Type	100	100	100	100
Breaker Dist.	100	100	100	100
Breaker Angle	95	100	100	100
Offshore Current Vel. and Dir. 1	41	-	100	-
Offshore Current Vel. and Dir. 2	100	0	23	-
Nearshore Current Vel. and Dir. 3	65	-	0	0
Longshore Current Velocity	97	100	65	79
Longshore Current Direction	97	100	75	96

Table 2.1 Data recovery. The data collected during each phase of the study are given as a precent time of the total possible observations.

	JULY/AUGUST						NOVEMBER					
	West (S1)			East (S2)			West (W1)			East (W1)		
	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.
Barometric Pressure (mb)	1003	1014.0	1022	1003	1014.3	1024	982	1011.3	1026	983	1011.3	1027
Air Temperature (^{o}C)	10.5	17.7	24.5	10.5	17.7	25.0	-2.0	+1.4	10.0	-4.5	+1.4	7.0
Wind Velocity (km/hr)	0	19.0	58	1.0	20.8	76	6	35.7	79	7	32.9	77
Wind Direction (^{o})	0	202.9	360	0	218.6	360	0	202.2	360	0	186.4	360
Water Level (cm)	102	122.3	168	53	96.4	139	44	94.3	147	-	-	-
Groundwater Level 1 (cm)	-	-	-	-	-	-	584	622.1	673	248	287.9	360
Groundwater Level 2 (cm)	-	-	-	-	-	-	579	618.1	667	225	281.3	322
Groundwater Level 3 (cm)	-	-	-	-	-	-	542	609.2	695	183	249.2	370
Rainfall (mm)	0	0.1	2.0	0	0.1	2.0	0	0.4	9.0	0	0.3	4.0
Offshore Wave Period (sec)	1.5	4.1	8.0	1.5	4.6	7.5	-	-	-	1.0	6.6	10.0
Offshore Wave Height (cm)	10	55.5	220	10	46.2	180	-	-	-	20	108.7	350
Nearshore Wave Period (sec)	1.5	4.2	8.0	1.5	4.4	7.5	2.8	5.1	12.1	2.0	5.2	9.7
Nearshore Wave Height (cm)	10	61.1	220	10	39.4	180	-	-	-	-	-	-
Breaker Height (cm)	0	58.5	200	0	36.8	200	20	106	400	10	77.8	400
Breaker Distance (m)	0	92.4	330	0	28.6	220	0	191.9	800	10	125.1	700
Breaker Angle (^{o})	0	101.9	180	0	82.2	180	0	87.7	180	0	61.5	180
Offshore Cur. Vel. 2 (cm/sec)	1	5.7	51	-	-	-	1	20.1	75	-	-	-
Offshore Cur. Dir. 2 (^{o})	0	114.9	360	-	-	-	20	112.7	235	-	-	-
Nearshore Cur. Vel. 3 (cm/sec)	1	10.4	80	-	-	-	-	-	-	-	-	-
Nearshore Cu. Dir. 3 (^{o})	0	96.7	360	-	-	-	-	-	-	-	-	-
Longshore Cur. Vel. 4 (cm/sec)	0	24.3	90	0	19.6	112	10	54.5	125	1	31.0	123
Longshore Cur. Dir. 4 (^{o})	180	272.9	360	180	302.4	360	180	266.7	360	180	262.5	360

Table 2.2 Summary of environmental variables

the Pointe au Loup wharf and the gauge installed here provided a 100% coverage during the winter phase.

(d) Wave Data: Four continuous wire-wound resistance-type wave staffs, 6.1 m in length, were installed on two sets of towers which were designed so that the staffs could be installed vertically in 6 m and 3 m water depths, relative to mean tide level. The towers were erected on the beaches (Photo 2.1) and towed to their respective sites (Fig. 1.1, 2.1) using buoys as flotation devices. At each beach underwater cables connected the resistance staffs to a Gould Brush 222 two-channel strip chart recorder. During the summer phase all four systems worked well, with only minor interruptions (Table 2.1) due to mechanical problems and, in one case, due to a cable break which was quickly repaired. Upon returning to the sites in October only the #4 tower and staff remained intact and operational. To record wave data on the west side during the winter phase a Hydro Products In-situ Wave and Tide Recorder (model 521) was installed at the site of the former #1 tower. This pressure sensor could not be recovered at the termination of the project due to adverse wave conditions.

The two Gould Brush recorders were operated at a chart speed of 1 mm/sec. For each three hour station the wave period was obtained by counting the number of zero crossings over a 100-second period. This was done three times and the values averaged. Significant wave height was taken as the highest one-third of all waves over a 100-second interval. Again, this was repeated to give three values which were then averaged.

(e) Nearshore currents: In the summer phase Aanderaa remote recording current meters (Model 4) were installed on the #1 and #3 towers (Fig. 2.1a). Data were recovered only from the former meter. Two Bendix Q-9 Savonius Rotor meters were installed in the trough and on the middle bar at the west beach site (Figs. 2.1a). These were connected to shore by underwater cables and provided both direct readout and analog records, the latter on Rustrak recorders. Examples of the Rustrak output are given in Figure 2.2. The meters were installed so that the rotors recorded a current 30 cm from the bottom. Both meters functioned well although the outer meter was subject to periodic burial as sand waves migrated over the equipment. Both meters were recovered before monitoring terminated as the rotors were excessively fouled and the meter bases had been tilted due to scour.

For winter operations Aanderaa meters were installed at the former #1 tower site and at the #3 tower site. The latter was not retrieved because of adverse wave conditions which prevented boat operations. One Braincon 381 current meter was set up at the #2 tower and a second in the nearshore trough landward of the #3 tower (Fig. 2.1b) on the east beach. Neither were recovered, in the latter case because it was buried by sand and could not be removed from its mounting. Data recovered from the Aanderaa meters at the #1 tower site on the west beach are given in Figures 2.4 and 2.5 (pages 61 and 99).

(f) Longshore Currents: Current velocities were measured using balloons filled with water. Movement of the balloon was timed with a stopwatch and the distance travelled measured by tape. Three velocities were averaged to obtain the recorded value. During storms great difficulty was experienced with this technique, particularly at night, and frequently no data were obtained.

(g) Breaker Variables: Breaker height was estimated from the beach. To provide a basis for estimation three posts, graduated every 10 cm, were placed in the breaker zone. However during storms when waves broke offshore the

Photo 2.1 Each of the four wave towers was assembled on the beach before being towed into position in the nearshore zone. This photograph shows the #4 tower which was installed in 6m of water at the east study site. The tower has three legs as a base and the assembled unit is held firm by nine wire stays. In this photograph the flotation buoys have been attached to the tower prior to "launching".

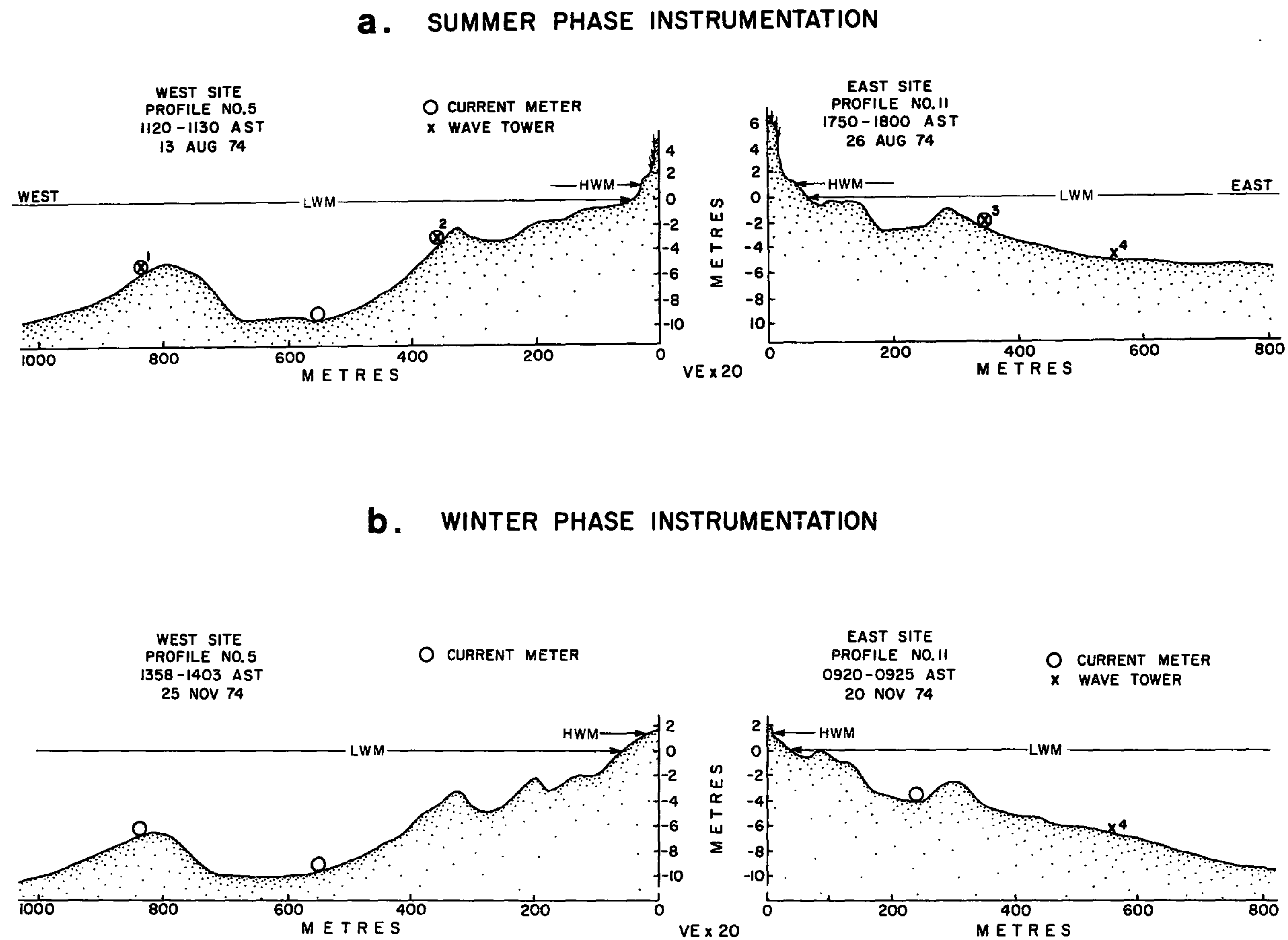


Figure 2.1 Instrument locations. The locations of the wave towers and current meters on these nearshore profiles are shown in relation to the nearshore topography. The exact geographic location of the instruments is shown in Figures 1.1c and 1.1d.

NEARSHORE CURRENT DATA

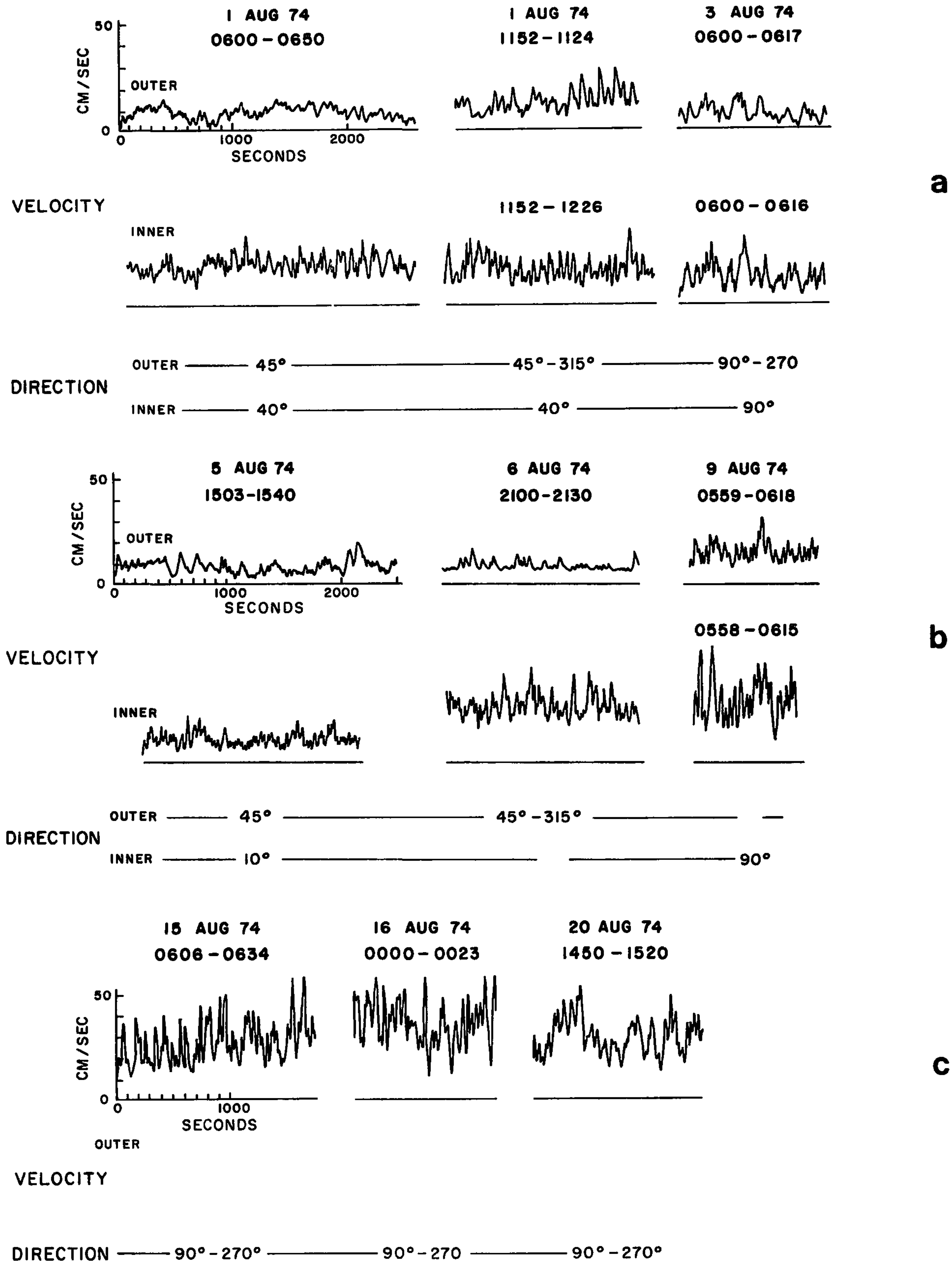


Figure 2.2 Selected samples of analog nearshore current data output from the two Bendix meters (CV2-CD2 and CV3-CD3) which were installed on the west site in the trough and at the middle bar, respectively (Fig. 1.1c) in the summer on the west site. The data points were recorded every second on a Rustrak chart recorder and are reproduced exactly in this series of diagrams.

accuracy of the estimates was reduced. Breaker distance was estimated to the nearest 10 m using the posts and wave towers as fixed reference points. Breaker angle was measured with a compass, and breaker type was recorded using the following scale (derived from Galvin, 1968):

1 = spilling breaker

2 = spilling-plunging

3 = plunging

4 = surging

5 = no breakers

Breaker period was measured during the winter phase by counting the time for eleven crests to pass a fixed point, such as a breaker post, and dividing the time by ten. This was repeated three times and the values averaged.

(h) Groundwater Elevations: During the winter phase, to monitor changes in groundwater elevation on the beach above mean high water level, three 3m plastic pipes, 5cm in diameter were buried to a depth of 2.0m. A small mesh screen, attached to the base of the pipe, prevented the entry of sand. An aluminum rod was attached to six corks which floated on the water surface in the pipe and the pipe tops were sealed leaving sufficient room for movement of the rod. The tops of the pipes were levelled into the beach survey network and measurement of the groundwater elevation was made from the top of the pipe to a mark on the aluminum rod.

Data Reduction:

A plot of the observed data and a cumulative plot of the first 15 Fourier harmonics was produced for each environmental parameter monitored at both study sites for both phases. This harmonic trend analysis using a single Fourier series was adopted from Fox and Davis (1971) and was applied in order to emphasize major trends by smoothing out minor fluctuations in the data. One example of the output from the Fourier analysis is given in Figure 2.3 and plots of the cumulative first 15 Fourier harmonics of selected data are given in Figures 2.6 to 2.14 following the data output.

Data Format:

The data are presented as (1) a series of tables of the computer print-out of the measured values; (2) a plot of the values; and (3) selected plots of data and cumulative Fourier curves. The plots of values are presented using the same units of measurement and in the same order as the sequence of columns in the computer print-out. The format for the computer print-out tables is:

S	Station, west(1) or east(2)
D	Day
T	Time (Atlantic Standard Time). Data collected during the winter phase are designated by the number 1 as the fourth digit in the time column (e.g. 2101)
BP	Barometric Pressure, in millibars
T	Air Temperature, in degrees Centigrade
SKY	Sky Condition, denoted by a code explained on page 13
WIND SPD	Wind Speed, in km/hr

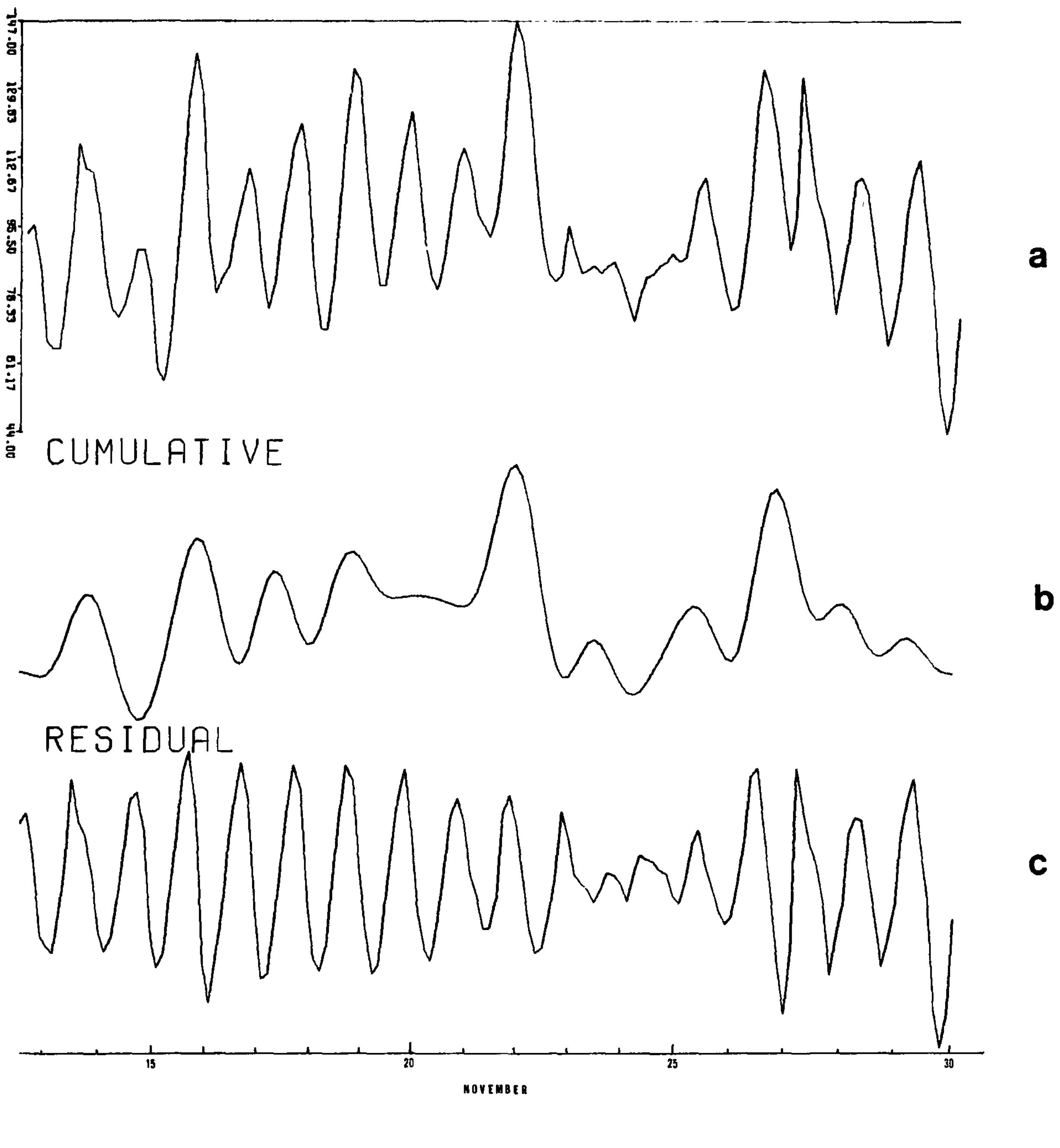


Figure 2.3 Winter west tide data, (a) observed data (in cm), (b) cumulative first 15 Fourier harmonics and (c) residual.

WIND DIR	Wind Direction, with reference to true north
WL	Water Level, in cm, from tide gauge records
GW1	Groundwater Elevation, in cm, at the #1 station (with reference to the study site datum plane)
GW2	Groundwater Elevation at the #2 station
GW3	Groundwater Elevation at the #3 station
R	Rainfall, in mm
OFFSHORE WP, WH	Offshore Wave Period (seconds) and Significant Wave Height (cm) recorded at the #1 and #4 towers
NEARSHORE WP, WH	Nearshore Wave Period (seconds) and Significant Height (cm) recorded at the #2 and #3 towers during the summer phase. In the winter phase Nearshore Wave Period was measured by timing the passage of eleven crests past a a fixed point
BREAKER HB	Breaker Height, in cm
BREAKER T	Breaker Type, noted using the code explained on page 20
BREAKER DIS	Breaker Distance, in meters, from the swash line
BREAKER ANG	Breaker Angle, measured with reference to the beach facing seaward (0° is to the left and 180° is to the right). Therefore, on the west beach a value of 150° refers to breakers approaching at an angle of 30° from the west-southwest. On the east site this value would refer to breakers out of the northeast at an angle of 30°
CV2, CD2	Offshore Current Velocity (cm/sec) and Direction (degrees true north) at the middle current meter (Outer Bendix) on the west site
CV3, CD3	Nearshore Current Velocity (cm/sec) and Direction (degrees true north) at the inner west site current meter (Inner Bendix)
CV4, CD4	Longshore Current Velocity (cm/sec) and Direction (0° = no current, 180° = to the south, and 360° = to the north)

The data plots (pages 45 to 120) are presented in the same units as the computer outputs of the data described above. The units on the horizontal (time) axis are number of days from the commencement of monitoring.

An index of the location of data and Fourier plots of the environmental variables is given in Table 2.3 (page 131).

SUMMER DATA

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
1	30	0	1019	16.5	5	23	225	156				0	2.0	30	2.0	30	0	5	0	150	10	30	13	30	28	360
1	30	300	1018	16.5	5	20	230	158				0	2.0	30	2.0	30	0	5	0	150	5	50	15	20	17	360
1	30	600	1019	16.5	5	20	225	139				0	2.0	20	2.0	20	0	5	0	145	1	45	5	30	15	360
1	30	900	1019	18.5	1	22	195	122				0	1.5	10	1.5	10	0	5	0	160	1	45	3	30	10	360
1	30	1200	1020	19.0	4	18	190	108				0	2.5	20	2.5	20	0	5	0	170	1	350	5	30	4	360
1	30	1500	1020	19.5	3	18	175	102				0	3.0	20	3.0	20	0	5	0	160	2	160	4	150	1	360
1	30	1800	1020	16.5	5	19	165	111				0	2.5	20	2.5	20	0	5	0	155	1	160	1	230	9	180
1	30	2100	1018	16.0	4	19	175	130				0	4.0	10	4.0	20	0	5	0	0	1	170	1	200	5	180
1	31	0	1017	16.0	4	15	200	149				0	4.0	10	4.0	10	0	5	0	0	1	45	1	40	15	360
1	31	300	1016	15.0	1	10	225	155				0	2.0	10	2.0	10	0	5	0	155	1	30	1	30	2	360
1	31	600	1015	15.5	2	16	190	142				0	3.0	10	2.0	10	0	5	0	150	1	350	1	50	3	360
1	31	900	1015	18.5	2	25	175	126				0	3.0	10	3.0	10	0	5	0	160	1	150	1	160	4	360
1	31	1200	1014	17.0	5	22	180	112				0	3.0	10	3.0	10	0	5	0	170	1	40	1	140	3	360
1	31	1500	1014	17.0	5	21	185	105				1	3.0	10	3.0	10	0	5	0	170	1	60	1	60	3	360
1	31	1800	1012	17.0	4	15	195	116				1	2.0	20	2.0	20	0	4	0	140	1	120	1	200	10	360
1	31	2100	1011	18.0	4	13	240	136				0	2.5	20	2.5	20	0	5	0	150	1	45	1	20	6	360
1	1	0	1010	17.0	1	17	240	168				0	2.0	20	2.0	20	0	5	0	155	1	30	1	30	20	360
1	1	300	1010	17.0	2	19	250					0	2.5	30	2.5	30	20	2	10	160	4	30	16	30	21	360
1	1	600	1009	16.0	2	19	275					0	3.5	50	3.5	50	50	2	50	155	13	30	15	40	25	360
1	1	900	1009	19.0	3	19	280					0	3.5	50	3.5	60	60	2	50	150	5	30	11	60	21	360
1	1	1200	1008	21.0	2	15	270					0	4.0	60	4.0	50	60	2	60	160	21	20	15	40	47	360
1	1	1500	1008	22.0	0	16	285					0	4.0	60	4.0	60	60	1	80	160	16	30	16	30	25	360
1	1	1800	1008	22.0	0	13	265					0	3.5	50	3.5	50	30	1	20	160	10	100	10	80	21	360
1	1	2100	1009	19.5	1	15	270					0	3.5	40	3.5	50	60	1	10	160	6	120	9	45	27	360
1	2	0	1009	18.5	1	20	300					0	3.0	50	3.0	50	60	2	50	150	8	30	13	20	34	360
1	2	300	1009	17.0	0	19	300					0	3.0	40	3.0	40	40	2	40	160	5	360	6	60	23	360
1	2	600	1010	17.0	0	31	320					0	4.0	70	4.0	70	70	2	80	160	14	30	26	80	62	360
1	2	900	1011	18.0	0	41	315					0	5.0	130	6.0	160	160	3	200	160	25	20	60	20	70	360
1	2	1200	1013	18.5	1	39	325					0	6.0	140	6.0	170	170	1	200	140	34	10	60	15	56	360
1	2	1500	1014	19.0	0	35	330					0	6.0	110	5.0	110	90	1	200	170	29	45	80	60	17	360
1	2	1800	1014	20.0	0	23	320					0	5.0	90	5.0	110	80	1	200	175	21	120	15	100	8	360
1	2	2100	1015	19.0	0	15	320					0	5.0	80	5.0	90	60	1	180	5	15	90	15	70	4	180
1	3	0	1016	17.0	0	3	255					0	5.5	80	5.5	80	60	1	180	5	13	90	21	190	48	180
1	3	300	1015	17.0	1	6	260					0	5.0	60	5.0	70	60	1	170	180	10	90	25	100	38	180
1	3	600	1015	18.5	1	11	275					0	4.0	60	4.0	60	70	2	150	180	10	90	18	90	26	180
1	3	900	1014	18.5	5	16	315					0	4.0	40	4.0	50	70	1	50	0	6	90	5	40	31	180
1	3	1200	1014	20.5	5	16	300					0	3.0	30	3.0	40	60	1	40	0	5	90	5	45	21	180
1	3	1500	1013	20.0	5	17	320					0	4.0	50	4.0	50	60	1	20	5	6	80	2	30	19	180
1	3	1800	1013	20.5	4	9	270					0	3.5	40	3.5	40	60	1	20	180	5	60	5	70	3	180
1	3	2100	1013	20.0	5	10	275					0	4.0	40	4.0	40	40	1	10	180	1	30	1	160	13	360

S	D	T	BP	T	SKY	WIND		WL	GW1	GW2	GW3	R	OFFSHORE		NEARSHORE		BREAKER				CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
1	4	0	1012	19.0	5	3	90					0	4.0	30	4.0	30	20	1	10	170	1	150	1	45	10	360
1	4	300	1012	19.0	5	1	240					1	4.0	20	4.0	20	20	1	10	170	1	90	1	45	9	360
1	4	600	1012	18.5	5	3	120					0	3.5	20	4.0	20	20	1	10	160	1	360	1	360	8	360
1	4	900	1012	20.0	5	9	150					0	4.0	20	4.0	20	30	1	10	10	2	10	1	200	4	180
1	4	1200	1011	19.5	5	8	160					0	4.0	20	4.0	20	30	2	10	5	3	25	1	190	3	180
1	4	1500	1011	21.0	5	8	145					0	3.0	20	3.0	20	20	1	10	0	2	45	1	30	2	360
1	4	1800	1010	20.0	5	11	210					0	3.0	10	3.0	10	10	4	10	170	1	50	1	220	10	360
1	4	2100	1009	19.0	5	15	185					1	3.0	10	3.0	10	10	4	10	180	1	180	1	180	6	360
1	5	0	1008	20.0	5	15	255					1	2.0	20	2.0	30	0	5	0	160	1	150	1	20	16	360
1	5	300	1006	21.0	5	20	270					0	2.0	30	2.0	30	30	1	10	155	1	45	5	10	28	360
1	5	600	1005	20.5	5	32	270					1	3.0	70	3.0	70	60	1	150	150	5	45	6	360	38	360
1	5	900	1004	20.5	5	37	275					0	3.0	70	3.5	70	100	1	150	155	3	120	10	30	66	360
1	5	1200	1004	22.0	3	41	270					0	3.5	100	3.5	90	120	2	170	155	15	40	13	25	63	360
1	5	1500	1003	24.0	2	38	280					0	3.5	90	3.5	90	80	1	190	160	8	350	9	10	45	360
1	5	1800	1003	22.0	2	31	295					0	4.0	80	4.0	80	80	1	180	160	4	5	7	10	65	360
1	5	2100	1005	20.0	1	30	315					0	5.0	70	5.0	60	80	1	200	160	5	20	10	40	26	360
1	6	0	1007	19.0	0	38	350					0	5.0	90	5.0	100	100	1	200	165	9	20	25	40	42	360
1	6	300	1008	18.5	0	26	320					0	6.0	90	6.0	110	90	1	150	175	12	60	26	340	9	360
1	6	600	1009	18.5	0	25	315					0	7.0	100	7.0	120	150	1	250	0	16	70	31	45	15	180
1	6	900	1011	18.5	0	24	315					0	5.0	90	5.0	110	100	1	250	170	20	90	15	90	1	360
1	6	1200	1011	19.0	0	27	315					0	4.0	80	4.0	90	100	1	250	170	7	70	25	50	31	360
1	6	1500	1011	19.0	1	32	320					0	4.0	80	4.0	80	100	1	250	155	7	30	19	45	32	180
1	6	1800	1011	20.5	1	28	320					0	4.0	70	4.0	80	90	1	190	150	7	40	24	50	22	180
1	6	2100	1012	17.0	1	6	150					0	4.5	60	4.5	80	70	1	150	170	1	40	21	200	33	180
1	7	0	1013	18.0	0	2	320					0	5.0	60	5.0	80	50	1	100	180	1	110	15	110	15	180
1	7	300	1013	19.0	3	28	320					0	6.0	90	7.0	120	120	1	200	175	10	80	26	90	41	180
1	7	600	1014	18.5	0	31	320					0	5.0	90	5.0	110	70	1	250	175	3	50	26	70	18	180
1	7	900	1014	19.5	0	30	300					0	5.0	90	5.0	110	80	1	250	170	3	80	30	70	30	360
1	7	1200	1013	21.5	2	33	300					0	5.0	90	5.0	110	100	1	270	165	3	70	30	70	62	360
1	7	1500	1012	23.0	2	40	285					0	5.0	100	6.0	110	100	1	180	30	12	30	25	60	69	360
1	7	1800	1011	22.0	3	38	280					0	6.0	110	6.0	110	130	1	260	160	30	0	19	30	90	360
1	7	2100	1010	18.5	5	23	40					2	6.0	100	6.0	90	60	1	150	170	5	280	8	95	42	360
1	8	0	1012	18.0	5	4	150					1	5.0	60	5.0	50	40	1	100	165	3	180	3	170	40	360
1	8	300	1012	18.0	5	16	50					0	4.0	40	4.0	40	40	2	100	175	1	350	1	180	20	180
1	8	600	1013	16.5	5	6	135					0	3.5	40	3.5	50	30	2	100	150	1	360	1	360	4	180
1	8	900	1013	16.5	5	9	120					1	3.5	40	3.5	40	40	2	100	30	1	350	1	180	20	180
1	8	1200	1014	15.5	5	13	75					1	3.5	50	4.0	50	40	2	200	30	1	190	1	200	17	180
1	8	1500	1015	14.5	5	16	75					0	4.0	60	4.0	60	50	1	180	30	8	200	2	250	30	180
1	8	1800	1016	15.0	2	32	55					1	5.0	80	5.0	80	70	1	230	30	4	210	9	220	39	180
1	8	2100	1017	14.5	1	30	40					0	5.0	80	5.0	80	60	1	200	30	2	200	5	250	41	180

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	ANG	CV2	CD2	CV3	CD3	CV4	CD4
1	9	0	1017	14.5	2	30	40					0	5.0	70	4.0	70	50	1	200	30	1	170	3	180	30	180
1	9	300	1017	15.5	1	32	25					0	4.0	60	3.5	60	60	1	180	20	1	90	5	200	31	180
1	9	600	1017	15.5	1	25	25					0	5.0	80	5.0	120	130	1	260	0	10	330	32	160	30	180
1	9	900	1017	16.5	0	23	5					0	5.0	80	5.0	100	100	1	260	10	12	250	15	200	43	180
1	9	1200	1018	17.0	0	22	0					0	5.0	80	5.0	100	90	1	250	0	11	230	13	180	45	180
1	9	1500	1018	16.5	2	28	15					0	5.0	80	5.0	100	120	2	250	0	6	180	31	200	30	180
1	9	1800	1019	16.5	1	29	360					0	5.0	80	5.0	90	120	1	200	0	3	100	25	125	52	180
1	9	2100	1020	16.5	0	27	5					0	5.0	80	5.0	100	130	1	210	5	6	130	11	110	43	180
1	10	0	1020	16.5	0	23	345					0	5.5	70	5.5	100	120	1	200	5	6	100	10	100	36	180
1	10	300	1019	17.0	0	17	325					0	5.0	70	5.0	80	100	1	180	5	1	120	7	130	34	180
1	10	600	1019	18.0	0	20	345					0	4.5	60	4.5	70	90	1	200	5	1	110	7	110	37	180
1	10	900	1020	17.0	0	24	355					0	4.0	60	4.0	70	100	1	200	5	1	140	10	140	43	180
1	10	1200	1020	17.0	0	24	360					0	4.0	60	4.0	70	100	1	160	10	1	120	9	100	31	180
1	10	1500	1020	17.0	1	25	360					0	4.0	60	4.0	70	120	1	200	10	2	120	2	70	35	180
1	10	1800	1020	18.0	1	25	345	127				0	4.0	60	4.0	60	80	1	170	10	1	110	10	70	37	180
1	10	2100	1021	17.0	1	20	355	129				0	4.0	70	4.0	60	80	1	150	5	1	100	6	110	45	180
1	11	0	1021	18.0	1	13	330	128				0	4.0	60	4.0	70	100	1	100	5	1	120	2	100	30	180
1	11	300	1021	17.0	0	13	310	124				0	4.0	60	4.0	70	100	1	80	5	1	100	4	110	41	180
1	11	600	1020	18.0	1	13	315	120				0	3.5	50	3.5	60	80	1	50	5	1	70	5	90	16	180
1	11	900	1020	19.0	1	16	305	117				0	3.5	50	3.5	60	60	1	60	180	1	90	10	100	29	180
1	11	1200	1019	20.0	1	19	310	117				0	3.5	60	3.5	60	60	1	80	180	1	80	13	80	27	180
1	11	1500	1018	20.5	1	18	310	121				0	4.0	70	4.0	70	100	1	90	5	1	110	10	110	24	180
1	11	1800	1018	20.5	1	8	305	128				0	4.0	60	4.0	60	100	1	30	5	1	110	8	70	20	180
1	11	2100	1018	19.0	0	7	295	132				0	4.0	50	4.0	40	50	1	30	175	1	130	5	60	14	360
1	12	0	1017	19.0	0	14	300	133				0	3.5	40	3.5	50	40	2	10	170	1	320	5	60	21	360
1	12	300	1016	19.0	0	13	300	132				0	3.5	50			40	2	20	180	1	320	5	70	21	180
1	12	600	1016	19.0	1	11	315	127				0	3.5	50			40	2	30	170	1	60	8	70	27	180
1	12	900	1017	20.0	1	8	315	124				0	4.0	50			40	2	30	165	1	20	5	60	29	180
1	12	1200	1017	20.5	1	8	330	122				0	4.0	40			30	1	30	170	1	120	1	90	31	180
1	12	1500	1017	22.0	0	1	320	125				0	3.5	30			30	1	20	180	1	45	1	180	14	180
1	12	1800	1017	24.5	0	0	0	137				0	3.5	30			20	1	10	170	1	45	1	90	0	180
1	12	2100	1017	19.0	0	2	225	142				0	3.5	30			30	1	10	180	1	40	1	40	0	360
1	13	0	1017	18.5	0	7	195	141				0	4.0	20			30	1	10	180	1	30	1	90	0	360
1	13	300	1017	18.0	0	8	195	134				0	4.0	10			20	2	10	180	1	60	1	20	0	360
1	13	600	1016	19.5	0	9	215	126				0	3.5	10			20	4	10	10	1	30	1	20	7	360
1	13	900	1017	24.0	0	12	240	118				0	2.5	20			20	1	10	40	1	30	1	20	13	360
1	13	1200	1016	26.5	0	14	245	112				0	3.0	30			20	1	20	30	1	80	1	40	32	360
1	13	1500	1016	28.0	0	15	260	113				0	3.0	50			20	1	40	140	1	320	1	260	10	360
1	13	1800	1014	29.0	0	18	230	121				0	3.0	50			40	1	10	145	2	50	1	30	20	360
1	13	2100	1015	21.0	0	21	225	131				0	3.0	50			20	1	10	150	1	350	1	10	20	360

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
1	14	0	1014	20.0	1	21	225	134				0	2.5	40			10	1	10	160	1	20	1	20	18	360
1	14	300	1013	19.0	1	16	225	130				0	2.0	20			10	1	10	170	1	10	1	30	12	360
1	14	600	1013	19.0	1	18	225	123				0	2.5	30			10	1	10	165	1	10	1	20	13	360
1	14	900	1011	20.0	1	19	215	115				0	2.5	30			10	1	0	135	1	10	1	20	15	360
1	14	1200	1009	20.5	1	17	210	110				0	2.5	20			10	1	10	160	1	30	1	20	11	360
1	14	1500	1008	21.0	5	6	150	108				0	3.0	20	3.0	20	10	4	10	170	1	330	1	180	6	180
1	14	1800	1007	20.5	5	3	175	114				0	3.5	20	3.5	30	10	1	10	150	1	165	1	180	3	180
1	14	2100	1008	20.0	5	1	345	128				0	3.5	20	3.5	20	10	1	10	150	1	90	1	180	2	180
1	15	0	1008	18.5	5	22	40	136				1	3.0	40	3.0	50	10	1	20	180	1	40	1	200	13	180
1	15	300	1009	17.0	5	51	20	135				0	4.0	120	4.0	130	100	1	220	0	15	140	17	120	44	180
1	15	600	1010	15.5	4	50	15	129				0	5.5	160	5.5	170	200	1	240	0	25	150	50	120	58	180
1	15	900	1011	15.0	4	53	10	123				0	8.0	220	8.0	220	200	1	240	180	51	200	50	250		
1	15	1200	1011	15.0	3	58	0	114				0	7.5	210	7.5	160	200	1	240	180	50	120	1	220	11	180
1	15	1500	1012	15.0	2	53	5	111				0	7.5	200	7.5	160	200	3	300	5	51	180				180
1	15	1800	1012	15.5	4	51	15	114				0	7.5	190	7.5	150	200	3	320	0	50	150			8	180
1	15	2100	1013	14.0	4	46	0	123				0	7.0	190	7.0	180	200	3	330		31	120				
1	16	0	1012	13.0	2	39	345	128				0	6.5	180	6.5	180	190	3	330		25	220				
1	16	300	1011	10.5	5	36	350	133				1	6.0	140	6.0	180	190	2	330		25	160				
1	16	600	1011	11.5	5	37	10	129				1	6.0	140	6.0	160	180	2	320	0	20	130				
1	16	900	1011	11.5	5	30	15	122				1	5.5	90	5.5	90	180	2	270	0	15	160			45	180
1	16	1200	1011	13.5	2	19	50	113				0	5.5	100			180	2	270	0	13	160			58	180
1	16	1500	1012	14.0	4	28	35	110				1	6.5	120			120	2	260	0	26	120			46	180
1	16	1800	1013	13.5	5	37	45	107				1	6.0	110	6.0	170	150	2	260	0	26	120			51	180
1	16	2100	1015	13.5	5	34	35	113				1	5.5	90	5.5	160	120	2	260		1	130				
1	17	0	1015	13.5	5	26	25	117				0	5.5	80	5.5	90	110	2	200		1	125			60	180
1	17	300	1015	14.0	5	21	30	123				0	5.0	70	5.0	90	100	2	180		1	90			51	180
1	17	600	1015	14.0	1	16	25	120				0	5.0	60	5.0	70	80	2	180	5	1	110			34	180
1	17	900	1015	15.0	1	12	330	116				0	4.5	60	4.5	50	80	2	180	5	1	120			18	180
1	17	1200	1015	17.0	1	10	315	106				0	4.5	50	4.5	50	40	1	100	10	2	90			33	360
1	17	1500	1014	19.0	5	8	300	104				0	4.0	40	4.0	40	40	1	20	0	1	30			7	360
1	17	1800	1013	18.5	1	15	215	105				0	3.0	30	3.0	30	20	1	10	0	1	40			10	360
1	17	2100	1013	16.5	0	12	200	112				0	3.5	30	3.5	30	20	2	10	0	1	45			5	360
1	18	0	1012	17.0	0	16	195	119				0	5.0	20	5.0	20	20	1	10		1	90			10	360
1	18	300	1011	16.5	1	12	210	126				0	5.0	20	5.0	20	30	1	10		1	10			19	360
1	18	600	1010	18.0	1	19	215	129				0	2.5	30	2.5	30	30	1	10		1	0			25	360
1	18	900	1010	18.5	5	26	215	124				0	3.0	40	3.0	40	20	1	10	150	1	0			30	360
1	18	1200	1008	18.0	5	34	225	118				1	3.0	50	3.0	50	20	1	10	160	1	360			36	360
1	18	1500	1007	18.5	5	40	225	113				0	3.0	50	3.0	50	100	1	100	160	1	10			61	360
1	18	1800	1007	18.0	5	30	240	114				1	3.5	60	3.5	60	100	1	120	160	1	10			65	360
1	18	2100	1008	18.5	1	11	285	117				0	3.5	50	3.5	50	20	1	30	150	1	300			11	360

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
1	19	0	1008	18.0	5	6	15	118				0	4.0	30	4.0	30	20	1	20	150	1	90			5	360
1	19	300	1009	16.0	5	5	20	120				0	4.0	30	4.0	30	30	1	10		1	340			7	360
1	19	600	1010	14.5	1	5	55	125				0	4.5	30	4.5	40	40	1	20	0	1	330			6	180
1	19	900	1012	16.5	0	0	0	124				0	5.5	40	5.5	40	40	1	30	0	1	335			43	360
1	19	1200	1013	18.5	0	5	30	117				0	4.5	30	4.5	30	30	1	20	10	3	120			12	180
1	19	1500	1014	21.5	0	4	160	113				0	4.5	30	4.5	30	20	2	20	0	3	360			5	180
1	19	1800	1015	20.0	1	2	195	114				0	4.5	30	4.5	30	20	1	20	5	5	50			2	180
1	19	2100	1016	18.5	0	0		115				0	4.5	30	4.5	30	20	1	10		1	130			5	180
1	20	0	1016	17.0	1	5	195	116				0	4.5	20	4.5	20	10	2	10	0	1	150				
1	20	300	1016	17.0	1	1	195	117				0	4.5	20	4.5	20	10	1	10	180	1	30			3	360
1	20	600	1017	16.5	1	0	0	121				0	4.5	10	4.5	10	10	1	10	180	1	330			1	360
1	20	900	1018	18.5	5	18	150	122				0	4.5	10	4.5	10	10	1	10	180	1	20			14	180
1	20	1200	1019	20.0	4	3	60	118				0	4.0	10	4.0	10	10	4	10	10	1	140			5	180
1	20	1500	1020	20.0	4	1	45	116				0	4.0	10	4.0	10	10	4	10	5	1	60			2	180
1	20	1800	1020	18.5	1	1	110	129				0	4.0	20	4.0	20	10	4	10	5	1	20			5	180
1	20	2100	1022	17.0	0	0						0	4.0	20	4.0	20	10	4	10	180	1	50			3	180
1	21	0	1022	16.0	0	0						0	4.0	10	4.0	20	10	4	10	180	1	145			2	180
1	21	300	1022	14.5	0	1	210					0	4.0	20	4.0	20	10	4	10	180	1	20			1	180
1	21	600	1022	15.5	2	1	255					0	5.0	10	5.0	10	10	4	10	0	1	30			3	360
1	21	900	1022	20.0	0	6	255					0	1.5	10	1.5	10	10	4	10	0	2	110			8	360
1	21	1200	1021	18.0	0	13	240					0	2.5	20	2.5	20	20	4	10	150	3	90			7	360
1	21	1500	1020	18.5	0	14	240					0	2.5	30	2.5	30	30	1	10	135	3	360			22	360
1	21	1800	1019	17.0	0	12	225					0	3.0	40	3.0	40	30	1	10	140	4	10			15	360
1	21	2100	1019	21.5	0	13	245					0	3.0	40	3.0	40	30	1	20	160	2	20			19	360
1	22	0	1018	20.0	0	28	280					0	3.5	50	3.5	50	40	1	30	155	5	360			52	360
1	22	300	1017	18.5	0	23	280					0	.5	60	4.0	60	50	2	70	160	11	340			72	360
1	22	600	1017	18.5	0	19	285					0	4.5	60	4.5	60	50	2	100	170	5	20			50	360
1	22	900	1016	19.0	0	19	300					0	4.5	50	4.5	50	40	1	100	170	5	30			33	360
1	22	1200	1016	20.5	0	11	285					0	5.0	60	5.0	60	60	1	120	165	8	60			37	360
1	22	1500	1015	23.0	0	13	285					0	4.5	50	4.5	50	80	1	100	165	7	40			45	360
1	22	1800	1014	24.5	0	12	255					0	4.0	50	4.0	60	60	2	100	155	8	30			40	360
1	22	2100	1014	22.0	0	28	275	128				0	4.0	70	4.0	70	100	1	80	160	3	30			46	360
1	23	0	1013	20.0	0	23	265	126				0	5.0	90	4.0	80	100	1	100	160	2	20			86	360
1	23	300	1013	19.0	0	23	325	118				0	5.0	70	4.0	80	100	2	100	160	1	30			83	360
1	23	600	1014	15.5	5	25	50	113				0	4.5	60	4.0	60	100	1	110	170	1	30			29	360
1	23	900	1016	17.0	2	13	90	111				0	4.0	50	4.0	50	90	1	100	165	1	140			17	180
1	23	1200	1018	18.0	1	19	70	111				0	4.0	70	4.0	70	90	1	100	30	1	160			19	180
1	23	1500	1018	17.0	4	14	65	113				0	5.0	50	5.0	60	80	1	80	25	2	160			26	180
1	23	1800	1019	16.0	5	15	120	117				0	4.0	60	4.5	70	80	1	70	30	1	90			23	180
1	23	2100	1019	16.5	5	22	120	125				0	4.5	50	4.5	50	30	1	10	10	1	270			22	180

S	D	T	BP	T	SKY	WIND	WIND	WL	GW1	GW2	GW3	R	OFFSHORE	OFFSHORE	NEARSHORE	NEARSHORE	BREAKER	BREAKER	BREAKER	BREAKER	CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	FB	T	DIS	ANG						
1	24	0	1018	13.5	5	25	125	122				1	4.0	50	4.5	50	30	1	10	0	1	150			38	180
1	24	300	1016	14.0	5	18	100	118				1	3.5	30	3.5	30	10	4	10	0	1	145			6	180
1	24	600	1015	15.0	5	23	170	115				1	5.0	20	5.0	20	10	4	10	0	1	45			2	180
1	24	900	1014	16.0	5	38	165	114				1	3.5	30	5.5	30	10	4	10	20	1	45			5	180
1	24	1200	1013	16.0	5	38	165	114				1	3.0	30	6.0	30	10	4	10	30	1	75			9	180
1	24	1500	1012	14.5	5	33	165	115				1	7.5	30	7.5	40	10	4	10	15	1	120			3	180
2	30	430	1018	16.5	5	27	210	114				0	4.0	60	3.5	50	40	2	30	30					41	360
2	30	730	1019	15.5	4	17	210	96				0	4.0	50	4.0	50	50	1	30	30					43	360
2	30	1030	1020	16.5	3	22	180	69				0	4.0	50	4.0	50	50	1	30	30					39	360
2	30	1330	1020	18.5	2	16	150	56				0	4.0	50	4.0	50	50	1	40	0					22	360
2	30	1630	1020	17.0	5	17	150	83				0	4.0	30	3.0	40	40	2	30	110					21	180
2	30	1930	1019	16.5	4	18	150	107				0	4.0	30	4.0	50	50	2	50	170					33	180
2	30	2230	1018	15.5	5	16	165	102				0	4.0	30	4.0	40	40	2	50	170					19	180
2	31	130	1017	15.5	3	23	165	100				0	4.0	30	4.0	30	40	2	40	170					16	180
2	31	430	1016	14.5	4	18	165	110				0	4.0	40	4.0	40	40	1	20	175					7	180
2	31	730	1015	16.0	2	25	150	108				0	4.0	50	3.0	30	50	2	20	180					8	360
2	31	1030	1014	17.0	0	24	150	80				1	5.0	40	4.0	40	40	1	20	170					16	360
2	31	1330	1014	17.0	5	23	150	57				1	4.0	50	4.0	50	60	1	50	170					13	180
2	31	1630	1012	16.0	5	16	180	81				1	4.0	50	4.0	50	60	2	50	170					25	180
2	31	1930	1011	16.0	4	18	195	111				0	4.0	50	4.0	50	50	2	40	180					26	180
2	31	2230	1010	16.0	1	20	210	111				0	4.0	50	4.0	50	50	2	50	180					15	360
2	1	130	1010	17.0	0	15	240	104				0	4.0	40	4.0	40	40	1	40	180					35	360
2	1	430	1009	17.0	4	20	255	115				0	4.0	40	4.0	40	30	2	40	180					20	360
2	1	730	1009	17.0	1	24	250	123				0	4.0	40	4.0	40	30	2	30	15					33	360
2	1	1030	1008	18.5	3	26	255	93				0	4.5	30	3.5	40	50	2	30	180					40	360
2	1	1330	1008	22.0	3	22	250	60				0	4.0	30	4.0	30	40	2	40	175					39	360
2	1	1630	1008	24.0	0	25	255	68				0	4.0	30	4.0	30	40	1	30	180					25	360
2	1	1930	1008	22.0	0	16	245	109				0	4.0	30	4.0	30	30	1	10	0					20	360
2	1	2230	1009	19.5	0	23	265	118				0	4.0	30	4.0	30	30	1	10	0					13	360
2	2	130	1009	19.0	0	23	270	99				0	2.5	20	2.5	20	20	1	10	20					20	360
2	2	430	1009	18.5	0	22	275	110				0	2.0	20	2.0	20	20	1	10	180					13	360
2	2	730	1010	18.5	0	32	285	125				0	2.0	20	2.0	20	20	1	10	0					13	360
2	2	1030	1012	20.0	1	41	295	104				0	2.0	20	2.0	20	20	1	0	180					19	360
2	2	1330	1014	21.0	1	39	300	60				0	1.5	20	1.5	20	20	1	0	180					32	360
2	2	1630	1014	20.5	0	27	300	62				0			5.0	20	10	1	10	180					22	360
2	2	1930	1015	19.5	1	16	265	101				0			6.0	20	10	1	0	180					13	360
2	2	2230	1016	16.0	1	9	295	113				0			6.0	20	10	1	10	10					3	360
2	3	130	1016	15.0	1	12	275	88				0			6.0	20	10	1	10	5					7	360
2	3	430	1015	16.5	1	15	275	93				0			6.0	20	10	1	10	5					7	360
2	3	730	1015	19.5	4	17	255	117				0			6.0	20	10	1	10	5					12	360

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
2	3	1030	1014	20.5	4	21	265	111				0			6.0	20	10	1	10	5					17	360
2	3	1330	1014	20.5	5	25	275	64				0			1.5	20	10	1	10	5					37	360
2	3	1630	1013	22.0	3	20	290	57				0			3.0	20	20	1	10	0					17	360
2	3	1930	1013	22.0	3	15	270	92				0			4.0	20	20	1	10	0					15	360
2	3	2230	1013	20.0	5	11	265	118				0			4.0	10	20	1	10	0					8	360
2	4	130	1012	18.5	5	4	265	95				0			4.0	10	20	1	10	0					3	360
2	4	430	1012	18.5	5	7	270	93				0			5.0	10	20	1	10	0					2	360
2	4	730	1012	18.5	5	4	160	117				1			5.0	10	20	1	10	180					7	180
2	4	1030	1012	18.5	5	8	120	117				0			5.0	10	20	1	10	180					5	180
2	4	1330	1011	20.0	5	8	120	79				0			5.0	10	20	1	10	0					3	360
2	4	1630	1010	19.5	5	10	165	58				0			5.0	10	0	1	10	5					10	360
2	4	1930	1009	18.0	5	10	135	93				0			3.0	10	0	1	10	180					1	180
2	4	2230	1009	17.0	5	12	120	120				1			3.0	10	10	1	10	0					4	360
2	5	130	1007	18.0	5	19	240	100				1			3.0	10	10	1	10	10					26	360
2	5	430	1005	19.0	5	25	240	87				1			2.0	20	20	1	20	30					27	360
2	5	730	1005	19.5	5	31	240	114				0			3.0	30	30	1	30	30					32	360
2	5	1030	1004	21.0	4	39	255	126				0			3.0	40	30	1	20	20					42	360
2	5	1330	1004	25.0	4	39	270	66				0			3.0	40	30	1	20	20					46	360
2	5	1630	1003	24.0	4	38	260	64				0			2.5	30	20	1	10	15					50	360
2	5	1930	1004	22.0	2	30	260					0			3.0	30	20	1	10	20					60	360
2	5	2230	1006	19.5	1	28	305					0			4.0	20	10	1	10	30					10	360
2	6	130	1007	18.0	0	20	305					0			5.0	10	20	1	10	180					3	360
2	6	430	1009	16.5	0	16	315					0			5.0	10	20	1	10	180					11	360
2	6	730	1010	18.0	0	22	290					0			5.0	10	10	1	10	10					8	360
2	6	1030	1011	18.5	1	29	295					0			5.0	10	10	1	10	10					9	360
2	6	1330	1011	19.5	1	33	305					0			1.0	10	10	1	10	5					14	360
2	6	1630	1011	20.0	1	30	300					0			4.0	10	30	3	10	5					14	360
2	6	1930	1011	19.5	1	19	265					0			4.0	10	20	1	10	5					8	360
2	6	2230	1012	15.5	0	5	310					0			4.0	10	10	3	10	180					1	180
2	7	130	1013	17.0	2	16	300					0			5.0	10	10	4	0	0					7	360
2	7	430	1014	18.0	1	19	295					0			5.0	10	30	4	10	0					13	360
2	7	730	1014	18.5	1	27	295					0			1.5	10	40	4	10	5					11	360
2	7	1030	1013	22.0	1	33	255					0			2.0	30	40	4	10	30					27	360
2	7	1330	1012	24.5	1	38	255					0			2.5	40	40	1	20	30					36	360
2	7	1630	1011	25.0	3	39	255					0	2.0	40	2.0	40	60	1	30	23					50	360
2	7	1930	1010	22.0	3	33	260					1	3.0	40	3.0	40	60	1	30	20					42	360
2	7	2230	1012	19.0	5	6	10					2	3.0	30	3.0	20	30	1	10						5	360
2	8	130	1012	16.0	3	5	315					0	4.0	20	4.0	20	20	1	10	0					2	360
2	8	430	1012	15.5	4	13	70					0	4.0	20	4.0	20	20	1	20	0					2	360
2	8	730	1013	15.5	5	8	55					1	3.0	20	3.0	20	20	1	10	0					10	360

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
2	8	1030	1013	15.5	4	21	95					1	3.0	20	3.0	30	30	2	10	160					21	180
2	8	1330	1014	16.0	5	25	70					1	3.0	20	3.0	30	40	1	20	160					32	180
2	8	1630	1015	16.5	5	25	65					1	3.0	30	3.0	30	60	1	70	170					44	180
2	8	1930	1016	13.5	2	23	15					0	3.0	30	3.0	30	40	2	50	175					36	180
2	8	2230	1017	13.0	3	24	10	107				0	4.5	30	4.5	30	30	2	10	150					30	180
2	9	130	1017	13.5	0	17	30	108				0	5.0	30	4.5	30	30	2	10	160					13	180
2	9	430	1017	14.0	0	19	355	79				0	5.0	30	5.0	30	50	2	10	170					13	180
2	9	730	1017	15.5	0	16	350	72				0	5.0	20	5.0	20	20	2	10	170					12	180
2	9	1030	1018	16.5	0	24	340	102				0	5.0	20	5.0	20	20	2	10	170					11	180
2	9	1330	1018	18.0	0	25	350	110				0	5.0	10	5.0	10	20	4	10	180					10	180
2	9	1630	1019	18.5	2	21	340	92				0	5.0	10	5.0	10	20	4	10	180					10	180
2	9	1930	1019	15.0	2	21	325	87				0	5.0	10	5.0	10	20	2	10	0					2	180
2	9	2230	1020	15.0	0	16	345	111				0	5.0	10	5.0	10	10	4	10	175					2	180
2	10	130	1020	15.0	0	15	310	116				0	5.5	10	5.5	10	10	4	10	0					2	360
2	10	430	1019	15.0	0	13	290	86				0	5.5	10	5.5	10	10	4	10	0					8	360
2	10	730	1020	17.0	0	18	315	69				0	6.0	10	6.0	10	10	4	10	0					9	360
2	10	1030	1020	17.0	0	23	315	91				0	6.0	10	6.0	10	10	4	10	0					3	360
2	10	1330	1020	18.5	0	25	330	115				0	6.0	10	6.0	10	0	5	0	0					1	360
2	10	1630	1020	18.5	1	23	320	93				0	6.0	10	6.0	10	0	5	0	0					1	360
2	10	1930	1020	16.5	1	13	315	87				0	6.0	10	6.0	10	0	5	10	0					2	360
2	10	2230	1021	16.5	1	11	310	102				0	6.0	10	6.0	10	0	4	10	0					2	360
2	11	130	1021	15.0	0	11	300	115				0	6.0	10	6.0	10	0	4	0	5					1	360
2	11	430	1020	15.0	0	11	290	92				0	6.0	10	6.0	10	0	4	0	5					6	360
2	11	730	1020	18.5	0	19	280	67				0	6.0	10	6.0	10	0	4	0	5					13	360
2	11	1030	1020	22.0	1	28	285	75				0	6.0	10	6.0	10	0	4	0	180					15	360
2	11	1330	1019	22.0	1	28	305	96				0	6.0	10	6.0	10	0	4	0	180					3	360
2	11	1630	1015	22.0	1	23	285	103				0					0	4	0	180					3	360
2	11	1930	1017	21.0	2	12	285	95				0					0	4	0	0					2	360
2	11	2230	1018	19.5	1	12	270	105				0					10	1	0	0					4	360
2	12	130	1017	18.5	1	16	265	116				0					10	4	0	5					6	360
2	12	430	1016	18.5	1	16	265	104				0					10	4	0	10					8	360
2	12	730	1017	19.0	1	13	300	72				0					10	1	0	5					6	360
2	12	1030	1017	20.0	1	17	300	70				0					10	1	30	5					8	360
2	12	1330	1017	23.0	1	11	300	91				0	4.5	60	4.5	60	10	1	0	10					4	360
2	12	1630	1017	24.0	0	6	195	100				0					10	1	10	5					1	360
2	12	1930	1016	20.0	1	8	220	99				0					10	1	10	5					1	360
2	12	2230	1017	19.5	1	7	195	101				0					10	4	0	0					4	360
2	13	130	1017	19.0	0	10	165	117				0					10	1	10	0					4	360
2	13	430	1016	19.0	0	12	195	114				0					10	1	10	5					5	360
2	13	730	1017	18.5	0	15	200	77				0					10	1	10	25					19	360

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
2	13	1030	1015	19.0	0	22	210	58				0					40	1	30	180					0	180
2	13	1330	1016	23.0	0	19	200	72				0					40	1	50	175					8	360
2	13	1630	1015	23.0	0	22	205	96				0	5.0	50	5.0	60	50	1	60	15					7	360
2	13	1930	1015	23.0	3	30	210	103				0	4.0	50	4.0	60	70	1	70	15					50	360
2	13	2230	1015	22.0	0	31	200	100				0	4.0	70	4.0	70	60	1	60	5					41	360
2	14	130	1014	19.5	2	27	205	108				0	4.0	70	4.0	70	70	1	60	5					32	360
2	14	430	1013	19.5	5	22	205	122				0	4.5	60	4.5	60	70	1	70	5					37	360
2	14	730	1012	18.5	5	24	210	96				0	4.5	60	4.5	60	70	1	60	5					46	360
2	14	1030	1010	18.0	5	17	195	67				0	4.5	50	4.5	50	60	1	50	5					29	360
2	14	1330	1009	19.0	5	14	165	70				0	5.0	50	5.0	50	40	4	60	180					4	360
2	14	1630	1008	20.0	4	8	130	105				0	5.0	60	5.0	50	30	1	20	180					30	180
2	14	1930	1007	20.0	5	7	125	127				0	5.0	60	5.0	50	70	1	20	175					42	180
2	14	2230	1008	19.0	5	12	355	118				1	5.0	50	5.0	50	40	2	20	175					14	180
2	15	130	1009	19.0	4	18	355	122				0	5.0	50	5.0	40	40	2	20	175					21	180
2	15	430	1009	17.0	4	38	345	135				0	5.0	30	5.0	30	20	2	10	175					5	180
2	15	730	1010	15.0	4	35	340	122				0	6.0	30	6.0	30	20	2	10	170					5	180
2	15	1030	1011	15.5	4	41	330	75				0	7.0	30	7.0	40	10	1	10	180					1	360
2	15	1330	1011	16.0	5	44	330	57				0	7.0	30	7.0	30	10	1	10	180					7	360
2	15	1630	1011	16.5	4	42	330	92				0	7.0	30	7.0	20	30	2	10	180					3	180
2	15	1930	1013	16.5	5	36	330	125				0	7.0	30	7.0	30	30	3	10	175					1	360
2	15	2230	1012	14.0	3	32	335	115				0	7.0	30	7.0	30	30	2	10	0					3	360
2	16	130	1012	13.5	5	28	325	108				0	7.0	30	7.0	30	20	2	10	0					3	360
2	16	430	1011	11.0	5	26	325	127				1	7.0	20	7.0	20	20	2	10	0					1	360
2	16	730	1011	10.5	5	24	335	138				0	7.0	20	7.0	20	20	2	10	180					4	180
2	16	1030	1011	10.5	4	21	335	100				1	7.0	20	7.0	20	20	1	10	180					7	180
2	16	1330	1012	13.5	2	19	45	66				0	2.5	30	2.5	30	30	1	10	180					9	180
2	16	1630	1012	13.5	5	28	15	86				1	2.5	30	2.5	30	30	1	10	150					20	180
2	16	1930	1014	13.0	5	27	10	126				1	2.5	40	2.5	40	30	2	10	155					17	180
2	16	2230	1015	11.5	5	22	0	116				0	2.5	30	2.5	30	30	2	10	155					11	180
2	17	130	1014	11.5	3	18	0	93				0	5.5	30	5.5	30	10	2	10	160					16	180
2	17	430	1015	11.5	3	13	345	105				0	6.0	40	6.0	40	40	2	10	165					5	180
2	17	730	1016	15.0	1	13	330	127				0	6.0	40	6.0	40	50	2	10	175					1	360
2	17	1030	1015	17.0	1	16	285	98				0	6.0	40	6.0	40	30	2	10	175					15	360
2	17	1330	1015	17.0	1	13	275	53				0	6.0	30	6.0	40	20	1	10	180					5	180
2	17	1630	1014	17.0	1	19	200	63				0	6.0	20	6.0	30	20	4	10	15					18	360
2	17	1930	1013	17.0	1	20	195	122				0	2.5	30	2.5	30	20	1	10	15					12	360
2	17	2230	1013	17.0	1	23	175	123				0	2.5	30	2.5	30	30	1	10	15					15	360
2	18	130	1011	17.0	0	22	195	94				0	2.5	30	2.5	30	40	1	20	15					27	360
2	18	430	1010	17.0	4	21	210	101				0	2.5	30	2.5	30	40	1	20	15					23	360
2	18	730	1010	17.0	5	31	195	139				0	3.5	60	3.5	60	50	2	40	25					55	360

S	D	T	BP	T	SKY	WIND		WL	GW1	GW2	GW3	R	OFFSHORE		NEARSHORE		BREAKER				CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
2	18	1030	1009	18.5	5	39	195	131				0	5.0	120	5.0	120	90	1	60	25					70	360
2	18	1330	1008	18.5	5	46	200	76				1	5.0	120	5.0	140	100	1	220	25					50	360
2	18	1630	1007	18.5	5	43	215	63				0	5.0	100	5.0	100	120	1	200	20					54	360
2	18	1930	1007	18.5	4	21	240	114				1	5.0	100	5.0	100	130	2	100	20					74	360
2	18	2230	1008	18.5	1	15	225	135				0	5.0	70	5.0	90	90	1	50	0					112	360
2	19	130	1008	18.5	5	5	260	95				0	5.0	60	5.0	60	40	1	30	0					67	360
2	19	430	1009	16.0	1	6	15	84				0	4.0	40	4.0	40	40	1	30	0					7	360
2	19	730	1011	16.0	5	5	130	128				0	4.0	30	4.0	30	20	1	10	0					3	180
2	19	1030	1013	17.0	0	6	110	134				0	4.0	30	4.0	30	20	1	10	0					4	180
2	19	1330	1014	20.0	0	11	335	77				0	4.0	30	4.0	30	20	1	20	0					15	360
2	19	1630	1014	20.0	0	9	0	57				0	5.0	30	5.0	30	20	2	20	0					10	360
2	19	1930	1015	20.0	0	10	165	97				0	5.5	30	5.5	30	20	2	10	0					7	360
2	19	2230	1016	19.0	0	11	150	129				0	5.5	30	5.5	30	20	2	10	0					3	180
2	20	130	1015	18.5	1	13	170	96				0	5.5	30	5.5	30	20	2	10	0					5	360
2	20	430	1017	16.5	1	5	150	69				0	6.0	20	6.0	30	20	1	30	180					8	360
2	20	730	1019	16.5	2	6	335	105				0	6.0	20	6.0	30	20	1	10	180					3	360
2	20	1030	1018	19.0	5	22	140	137				0	2.5	40	2.5	40	40	1	10	170					9	180
2	20	1330	1020	20.5	5	6	0	99				0	2.5	40	2.5	40	30	1	10	175					1	180
2	20	1630	1020	20.5	0	7	135	64				0	3.5	30	3.5	30	30	2	20	0					11	360
2	20	1930	1021	19.0	1	4	75	87				0	5.0	30	5.0	30	20	2	20	180					3	180
2	20	2230	1021	16.5	1	1	265	126				0	6.5	30	6.5	30	20	2	20	180					1	360
2	21	130	1021	16.0	0	7	175	106				0	6.5	30	6.5	30	20	2	10	0					1	360
2	21	430	1021	15.5	1	8	250	54				0	6.5	20	6.0	20	20	2	20	5					9	360
2	21	730	1021	16.5	1	10	205	74				0	7.0	30	7.0	30	20	2	10	180					10	360
2	21	1030	1022	19.0	0	20	205	120				1	2.0	30	2.0	30	30	2	10	5					13	360
2	21	1330	1021	19.0	0	24	210	101				0	2.5	40	2.5	40	30	2	10	30					14	360
2	21	1630	1019	19.5	0	22	210	61				0	2.5	40	2.5	40	30	1	40	20					30	360
2	21	1930	1019	20.5	0	17	225	74				0	3.0	40	3.0	40	30	1	10	10					32	360
2	21	2230	1018	21.0	0	26	250	116				0	3.0	40	3.0	50	40	2	20	10					21	360
2	22	130	1018	20.5	0	31	265	104				0	4.0	50	4.0	50	40	1	40	10					40	360
2	22	430	1017	20.0	0	26	265	56				0	4.0	50	4.0	50	40	2	40	10					32	360
2	22	730	1017	20.0	0	26	280	65				0	4.0	40	4.0	50	40	1	20	20					35	360
2	22	1030	1017	21.0	0	25	280	116				0	4.0	40	4.0	40	30	2	10	10					13	360
2	22	1330	1016	23.5	0	25	270	122				0	5.0	40	5.0	40	40	2	10	10					21	360
2	22	1630	1015	23.5	0	21	260	84				0	4.0	40	4.0	40	20	1	20	10					20	360
2	22	1930	1014	23.5	0	20	240	90				0	3.0	50	3.0	40	30	2	20	15					21	360
2	22	2230	1013	23.0	0	32	270	127				0	3.0	50	3.0	50	10	2	10	15					17	360
2	23	130	1013	21.5	0	31	270	122				0	2.5	40	2.5	40	20	1	10	15					15	360
2	23	430	1013	20.0	0	21	340	74				0	4.0	30	4.0	30	20	1	20	5					8	360
2	23	730	1015	16.0	4	19	60	68				0	2.5	40	2.5	40	30	1	10	140					20	360

S	D	T	BP	T	SKY	WIND		WL	GW1	GW2	GW3	R	OFFSHORE		NEARSHORE		BREAKER				CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
2	23	1030	1017	18.0	5	21	75	103				0	3.0	40	3.0	40	30	2	10	155					41	180
2	23	1330	1018	18.0	4	22	80					0	3.0	50	3.0	50	40	4	10	155					20	180
2	23	1630	1018	17.0	5	21	75					0	3.0	50	3.0	50	40	1	30	160					34	180
2	23	1930	1019	16.5	5	28	110					0	3.5	60	3.5	60	50	2	40	160					39	180
2	23	2230	1019	16.5	5	32	105					1	3.5	70	3.5	70	80	1	70	160					73	180
2	24	130	1017	14.5	5	31	105					1	4.0	80	4.0	70	90	2	80	170					79	180
2	24	430	1016	14.0	5	29	150					1	4.0	70	4.0	70	90	2	90	180					20	180
2	24	730	1015	14.5	5	41	150					1	4.0	70	4.0	70	90	2	110	180					71	180
2	24	1030	1014	14.5	5	76	145					1	6.0	150	6.0	180	200	2	160	180					51	180
2	24	1330	1012	14.5	5	46	140					1	7.0	180	7.0	180	200	2	200	180					60	180
2	24	1630	1012	14.5	5	40	140					0	6.5	170	6.5	170	170	2	160	180					35	180
2	24	1930	1011	14.5	5	23	145					0	6.5	160	6.5	160	160	2	160	180					18	180
2	24	2230	1011	16.5	5	7	220					0	6.0	150	6.0	150	150	2	160	180					55	180
2	25	130	1009	16.5	5	11	240					1	7.5	100	7.5	120	120	2	150	180					30	180
2	25	430	1008	16.5	3	9	310					2	7.5	100	7.5	120	120	2	150	180					18	180
2	25	730	1009	15.0	5	25	270					0	7.5	120	7.5	140	120	2	150	180					20	180
2	25	1030	1011	15.0	2	34	325					0	7.5	100	7.5	90	130	3	110	0					27	360
2	25	1330	1011	16.0	5	34	315					0	7.5	70	7.5	70	80	2	80	180					37	180
2	25	1630	1015	13.5	5	37	15					1	5.0	60	5.0	60	80	2	60	170					27	180
2	25	1930	1018	11.5	5	32	10					1	5.0	60	5.0	60	60	2	50	180					38	180
2	25	2230	1019	11.5	3	25	20					0	5.0	60	5.0	60	70	2	50	180					43	180
2	26	130	1020	11.5	2	20	15					0	5.5	50	5.5	50	40	2	50	175					30	180
2	26	430	1021	11.5	2	15	15					0	5.5	50	5.5	50	60	2	40	170					34	180
2	26	730	1023	13.5	1	10	75					0	6.0	50	6.0	50	60	1	30	175					22	180
2	26	1030	1024	16.5	0	7	135					0	6.0	40	6.0	60	50	2	30	175					13	360
2	26	1330	1023	18.0	1	12	160					0	4.5	40	4.5	50	40	1	30	175					10	180
2	26	1630	1022	16.5	1	13	175					0	4.5	40	4.5	40	40	1	30	180					5	180
2	26	1930	1021	14.5	1	10	195					0	4.0	40	4.0	40	40	1	30	170					3	360
2	26	2230	1020	14.5	1	20	205					0	2.5	40	2.5	40	40	1	20	175					10	360
2	27	130	1019	14.5	5	15	225					0	4.0	70	4.0	70	30	1	30	0					13	360
2	27	430	1018	14.5	5	22	235					0	4.0	70	4.0	70	40	1	50	0					41	360
2	27	730	1017	14.5	5	27	220					0	4.0	80	4.0	80	80	1	50	20					23	360
2	27	1030	1017	16.5	3	34	210					0					80	1	50	20					38	360
2	27	1330	1016	16.5	3	41	210					0					80	1	70	15					60	360

WINTER DATA

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
1	12	1201	1026	3.5	1	25	90	94	590	587	568	0			4.4		30	1	10	20	5	200			16	180
1	12	1501	1025	5.0	5	21	105	96	590	587	580	0			8.0		30	1	10	20	5	200			21	180
1	12	1801	1024	4.5	1	21	95	86	592	587	578	0			4.9		30	2	10	20	16	200			40	180
1	12	2101	1024	4.0	3	25	90	67	590	587	578	0			5.2		40	2	10	10	17	210			21	180
1	13	1	1022	6.0	5	55	105	65	592	584	579	0			5.7		50	2	20	10	16	235			38	180
1	13	301	1021	5.0	5	64	105	65	598	580	566	1			5.0		100	3	150	20	16	210			13	180
1	13	601	1019	4.5	5	73	105	78	584	579	563	1			7.1		100	3	150	30	21	200			23	180
1	13	901	1017	4.5	5	79	105	93	597	580	587	1			6.1		140	2	150	20	21	200			41	180
1	13	1201	1015	5.0	5	73	115	116	591	599	625	1			5.1		110	3	100	30	15	180			32	180
1	13	1501	1013	6.0	5	70	120	110	604	627	625	1			7.0		180	3	150	60	15	180			70	180
1	13	1801	1010	6.5	5	69	115	109	624	641	630	0			12.1		200	3	150	45	24	180			10	180
1	13	2101	1009	6.0	5	53	115	100	631	644	622	1			6.4		170	2	150	20	13	180			20	180
1	14	1	1013	8.0	4	24	185	84	630	635	612	1			6.2		130	2	150	30	21	160			20	180
1	14	301	1017	5.5	1	36	250	75	631	625	620	1			4.5		50	2	150	30	24	30			85	360
1	14	601	1020	5.0	0	36	255	73	618	615	620	1			4.3		70	2	200	30	25	45			83	360
1	14	901	1025	5.0	0	27	235	76	615	608	610	1			4.3		100	1	200	140	32	60			94	360
1	14	1201	1025	8.0	0	15	210	82	612	606	612	1			5.8		90	1	180	140	21	60			92	360
1	14	1501	1024	7.0	0	19	170	90	612	606	605	0			5.4		100	2	180	180	16	45			46	360
1	14	1801	1024	7.0	1	22	175	90	611	606	611	0			4.4		50	2	150	150	11	90			32	360
1	14	2101	1023	8.0	0	27	175	82	609	610	616	0			4.8		50	2	150	150	8	45			24	360
1	15	1	1022	6.0	5	27	160	60	605	602	615	0			4.2		50	2	10	160	8	50			32	360
1	15	301	1021	8.0	5	29	195	57	604	597	585	0			3.9		30	2	10	160	10	30			33	360
1	15	601	1019	7.0	4	29	165	66	602	592	575	0			3.5		30	2	10	150	6	40			25	360
1	15	901	1016	8.5	5	37	160	87	599	592	574	0			2.9		30	2	10	145	1	50			25	360
1	15	1201	1012	9.0	5	38	160	107	599	591	579	0			3.1		20	2	10	140	18	50			28	360
1	15	1501	1007	9.5	5	35	160	128	599	594	596	1			3.2		40	2	10	135	19	30			26	360
1	15	1801	1003	10.0	5	32	180	139	604	608	633	1			3.4		40	2	10	150	23	30			35	360
1	15	2101	1001	6.0	5	28	285	128	607	614	638	1			3.6		50	2	50	150	12	20			53	360
1	16	1	1004	2.0	5	33	290	92	610	612	610	1			4.2		50	2	70	150	15	45			66	360
1	16	301	1006	3.0	5	45	270	79	614	609	600	1			4.8		70	2	90	150	33	45			50	360
1	16	601	1007	3.0	5	51	280	83	613	607	608	0			4.6		80	2	120	150	75	180			43	360
1	16	901	1008	3.5	4	52	280	86	612	608	610	0			5.6		180	2	380	150	50	130			32	360
1	16	1201	1009	4.0	2	54	285	96	612	611	614	0			6.3		250	2	400	150	50	110			90	360
1	16	1501	1010	3.5	4	42	285	102	616	616	618	0			6.4		200	2	350	150						
1	16	1801	1011	3.5	5	45	295	110	619	622	620	0			6.1		150	2	350	150						
1	16	2101	1012	2.0	3	47	290	104	623	627	623	0			4.3		100	2	350	150						
1	17	1	1013	2.0	2	49	300	86	623	626	610	0			4.4		100	2	350	170						
1	17	301	1013	2.0	4	46	305	75	623	612	609	0			3.5		80	2	300	175						
1	17	601	1014	1.5	5	41	300	81	622	612	610	0			5.5		130	2	250	175						
1	17	901	1015	1.5	5	39	300	95	620	613	614	0			5.6		150	2	260	175					44	360

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	BREAKER T	BREAKER DIS	BREAKER ANG	CV2	CD2	CV3	CD3	CV4	CD4
1	17	1201	1014	1.5	3	41	300	106	621	617	620	0			5.1		200	2	280	175					34	360
1	17	1501	1014	3.0	1	35	300	116	627	629	633	0			5.5		200	2	280	175					52	360
1	17	1801	1015	2.0	4	39	260	121	631	623	629	0			6.0		200	2	200	175					49	360
1	17	2101	1013	3.5	2	31	260	111	632	627	630	0			5.1		150	2	200	175					31	360
1	18	1	1012	3.0	2	34	265	84	633	621	624	0			5.3		100	2	200	170					32	360
1	18	301	1011	3.0	3	28	265	70	627	621	612	0			4.0		70	2	170	170					30	360
1	18	601	1011	2.0	3	30	265	70	622	618	609	0			4.3		80	2	150	175					35	360
1	18	901	1010	3.5	3	21	240	81	622	610	610	0			2.8		80	2	150	170					70	360
1	18	1201	1007	4.0	5	33	240	102	618	609	610	0			4.7		120	1	150	170					119	360
1	18	1501	1005	4.5	5	35	240	121	619	612	617	0			4.4		120	1	150	170						
1	18	1801	1005	4.0	4	44	270	135	623	618	630	0			5.0		150	1	150	170						
1	18	2101	1005	4.4	4	44	270	132	628	637	645	0			5.9		170	2	200	170						
1	19	1	1006	3.5	1	43	285	110	631	626	620	0			4.7		170	2	200	170						
1	19	301	1007	3.0	2	48	300	93	630	622	612	0			4.1		170	2	200	170						
1	19	601	1008	2.0	2	48	300	81	622	616	606	0			4.3		160	2	280	170						
1	19	901	1010	1.0	3	41	295	81	618	613	605	0			6.5		200	2	280	170					44	360
1	19	1201	1010	2.0	2	38	290	93	617	613	609	0			6.8		400	1	800	170						360
1	19	1501	1011	1.5	1	44	295	106	620	614	615	0			3.8		400	1	600	160						
1	19	1801	1012	1.0	2	40	305	117	628	625	614	0			4.4		70	1	250	165						
1	19	2101	1014	1.0	1	39	320	124	634	635	630	0			4.9		70	1	250	165						
1	20	1	1015	0	2	40	315	110	636	633	628	0			5.3		70	2	250	30						
1	20	301	1016	-0.5	1	33	330	92	635	629	618	0			3.8		80	2	250	30						
1	20	601	1016	-1.0	2	30	325	83	630	629	623	0			4.0		80	2	250	20						
1	20	901	1017	-1.0	5	27	315	80	625	619	603	0			3.5		80	2	250	5					55	180
1	20	1201	1016	0	5	20	270	88	620	612	618	0			4.2		90	2	200	0					49	180
1	20	1501	1015	0	5	26	275	100	618	612	613	0			3.5		100	2	500	10					38	180
1	20	1801	1016	-0.5	1	19	300	111	618	608	606	0			4.3		100	2	200	15						
1	20	2101	1015	-1.0	2	18	330	115	618	608	599	0			4.4		80	2	80	15						
1	21	1	1014	-1.0	1	6	15	110	615	606	600	0			3.8		40	2	40	15					46	180
1	21	301	1013	-1.0	5	12	60	99	616	605	605	0			4.5		30	2	50	30					37	180
1	21	601	1010	-2.0	5	18	70	96	611	606	695	0			3.7		40	2	50	30						
1	21	901	1008	-2.0	5	29	60	93	608	602	693	0			4.1		50	3	30	40					41	180
1	21	1201	1003	-1.5	5	36	45	99	605	598	590	0			4.6		80	2	200	40						
1	21	1501	999	-1.5	5	46	105	113	608	600	593	0			5.0		150	2	400	40					97	180
1	21	1801	997	-1.0	5		135	138	638			0			6.3		150	2	400	45					124	180
1	21	2101	997	-0.5	5		120	147	655	661		0			5.7		200	2	400	40						
1	22	1	997	-0.5	5		120	142	670	636		0			6.2		200	2	400	40						
1	22	301	997	-0.5	5		120	128	673	650		0			6.9		150	2	400	40						
1	22	601	1000	-0.5	5		90	108	668	656	635	0			6.3		100	2	400	40						
1	22	901	1003	-0.5	5		100	93	660	629	625	1			4.4		200	2	400	35					113	180

S	D	T	BP	T	SKY	WIND		WL	GW1	GW2	GW3	R	OFFSHORE		NEARSHORE		BREAKER				CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
1	22	1201	1004	0	5		120	84	656	645	621	1			4.3		160	2	320	40					112	180
1	22	1501	1006	0	5			82	654	643	626	0			4.3		150	2	280	30					105	180
1	22	1801	1010	0	5			84	650	649	612	0			4.7		150	2	250	25						180
1	22	2101	1013	0	5			96	643	649	612	0			7.1		150	2	200	20						180
1	23	1	1015	0	5			90	637	648	610	0			6.3		150	2	200	15						180
1	23	301	1018	0	1			84	636	631	610	0			5.5		100	2	250	30						180
1	23	601	1020	0	5			85	636	624	600	0			5.7		100	2	250	30						180
1	23	901	1022	0	5			86	632	622	603	0			4.8		70	2	200	20					42	180
1	23	1201	1023	0	5		5	84	629	621	600	0			5.3		90	2	180	20					48	180
1	23	1501	1023	-0.5	3		355	86	625	616	609	0			5.2		70	2	100	25					43	180
1	23	1801	1025	-1.0	3		355	87	619	612	598	0			5.5		70	2	100	25						180
1	23	2101	1024	-1.0	4		320	83	16	610	594	0			5.2		60	2	100	20						180
1	24	1	1024	-2.0	3		270	78	613	606	597	0			5.6		50	2	80	15						180
1	24	301	1023	-2.0	3		225	72	609	600	620	0			5.0		50	2	80	0						180
1	24	601	1023	-1.0	5		210	78	607	597	590	0			5.1		40	2	10	170					39	360
1	24	901	1021	0	5		195	83	605	596	607	1			5.1		40	2	40	160					84	360
1	24	1201	1019	1.0	5		195	84	606	595	603	0			5.5		50	2	30	160					125	360
1	24	1501	1016	1.0	5		175	86	605	593	605	0			5.4		40	2	30	160					100	360
1	24	1801	1014	2.0	5		175	87	605	593	578	4			4.8		40	2	70	155					73	360
1	24	2101	1011	3.0	5		170	89	602	595	579	9			4.7		40	2	70	155					55	360
1	25	1	1009	3.0	5		210	87	605	598	574	0			4.6		40	2	40	155					54	360
1	25	301	1008	1.0	5	10	245	88	599	598	555	1			3.9		50	2	0	160					46	360
1	25	601	1008	1.0	5	22	360	96	604	597	542	1			4.7		50	2	10	160					20	360
1	25	901	1010	1.0	5	22	360	105	605	602	562	2			3.7		30	2	20	40					22	180
1	25	1201	1011	1.0	5	25	360	108	608	611	557	2			4.2		30	2	10	40					48	180
1	25	1501	1012	1.0	5	19	5	98	611	612	603	2			4.3		30	2	10	30					61	180
1	25	1801	1013	1.0	5	13	30	90	613	611	594	2			4.4		50	2	50	25					69	180
1	25	2101	1013	.5	5	18	35	81	614	612	599	2			5.5		60	2	80	30					36	180
1	26	1	1012	0	5	18	30	75	609	610	601	2			5.7		60	2	80	40						180
1	26	301	1010	.5	5	24	35	76	606	597	600	2			5.6		60	2	80	30					51	180
1	26	601	1007	.5	5	26	35	87	606	600	597	2			5.6		90	2	90	40					67	180
1	26	901	1001	.5	5	30	35	101	616	627	596	2			7.6		90	2	300	40					107	180
1	26	1201	994	.5	5	29	65	124	632	647	600	3			4.7		150	2	250	50					120	180
1	26	1501	985	1.0	5	36	120	135	650	654	602	4			7.2		180	2	280	40					100	180
1	26	1801	984	2.0	1	34	130	129	656	661	599	0			5.9		200	2	250	40						180
1	26	2101	986	2.0	5	41	170	119	655	662	679	0			6.6		180	2	250	40						
1	27	1	986	1.0	5	43	160	104	651	667	675	0			5.5		170	2	250	40						
1	27	301	986	1.0	5	44	155	90	648	652	671	0			5.8		150	2	200	30						
1	27	601	984	1.0	5	43	155	98	648	644	680	0			6.4		150	2	200	30					93	360
1	27	901	982	1.0	5	47	210	133	645	649		0			6.8		190	2	400	160					107	360

S	D	T	BP	T	SKY	WIND	WIND	WL	GW1	GW2	GW3	R	OFFSHORE	OFFSHORE	NEARSHORE	NEARSHORE	BREAKER	BREAKER	BREAKER	BREAKER	CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
1	27	1201	988	1.0	5	62	270	117	655	637		0			5.3		200	2	400	160					100	360
1	27	1501	992	1.0	5	54	280	104	646	647		0			4.2		180	2	400	170					58	360
1	27	1801	1010	.5	3	50	285	98	641	640		0			5.5		150	2	300	170						
1	27	2101	998	.5	5	59	275	89	640	636		0			6.7		150	2	300	170						
1	28	1	1000	.5	5	56	275	74	639	638		0			6.1		150	2	300	170						
1	28	301	1002	1.0	5	49	275	84	629	625		0			5.3		100	2	300	170						360
1	28	601	1004	1.0	5	45	290	92	631	625		0			5.5		80	2	300	170						360
1	28	901	1007	1.0	5	41	280	107	630	635		0			4.4		100	2	250	170					54	360
1	28	1201	1009	1.0	5	41	290	108	636	638		0			5.6		150	2	300	170					73	360
1	28	1501	1010	2.0	4	32	300	104	639	642		0			4.2		150	2	300	0					42	360
1	28	1801	1013	2.0	5	21	320	90	639	641		0			5.9		140	2	250	175						360
1	28	2101	1014	1.0	3	20	350	77	630	627		0			5.7		100	2	100	0						360
1	29	1	1015	1.0	5	18	25	66	628	621		0			5.4		100	2	100	0						
1	29	301	1016	1.0	4	19	5	73	624	615		0			4.8		100	2	200	10					18	180
1	29	601	1016	1.0	3	29	355	82	621	612		0			4.6		100	2	200	25					68	180
1	29	901	1017	1.0	5	30	30	99	621	611		0			3.7		80	2	250	20					59	180
1	29	1201	1018	1.0	5	21	55	108	624	610		0			5.8		70	2	200	25					67	180
1	29	1501	1019	.5	5	17	45	112	627	628		0			5.4		70	2	200	20					83	180
1	29	1801	1021	0	5	34	60	96	632	636		0			6.2		70	2	200	20						
1	29	2101	1023	0	5	36	95	81	628	630		0			5.9		70	2	200	20						
1	30	1	1024	0	5	34	90	54	626	625		0			5.7		70	2	200	20						
1	30	301	1025	.5	5	35	10	44	623	615		0			6.6		100	2	200	30					28	180
1	30	601	1026	.5	5	32	300	51	618	609		0			4.8		60	2	200	30					36	180
1	30	901		.5	5	40	355	73	616	614		0			4.0		70	2	200	10					86	180
2	12	1031	1027	.5	4	26	60		250	225	184	0	4.0	70	4.5		50	2	60	150					31	180
2	12	1331	1025	.5	5	35	75		279	238	183	0	4.5	120	5.5		150	3	280	175					33	180
2	12	1631	1025	.5	5	43	85		283	275	211	0	5.0	150	5.5		150	2	280	170					40	180
2	12	1931	1024	.5	1	47	90		286	260	222	0	5.0	180	4.5		200	2	280	170					68	180
2	12	2231	1023	.5	5	48	100		298	258	204	0	5.0	200	5.8		200	2	280	170					29	180
2	13	131	1021	4.0	5	57	95		289	250	184	1	6.5	250	5.6		200	2	280	180					10	180
2	13	431	1020	4.0	5	60	95		300	260	209	1	7.0	310	6.6		200	2	280	180						180
2	13	731	1019	4.0	5	69	100		300	260		1	7.0	330	6.7		400	2	340	180						180
2	13	1031	1017	3.5	5	77	100		312	260		0	7.0	340	6.6		400	2	500	180					48	180
2	13	1331	1014	3.5	5	68	100		304			0	8.0	350	6.9		400	2	500	180						180
2	13	1631	1011	4.0	4	72	105		303			0	8.5	350	8.6		400	2	700	175						180
2	13	1931	1009	4.0	5	72	130		300	292		0	8.5	350	7.3		300	2	700	170						180
2	13	2231	1010	3.5	5	39	150		300	290		1	8.5	300	7.9		100	1	700	170						180
2	14	131	1014	3.5	1	25	225		325	320		1	8.0	170	8.0		100	2	230	30						180
2	14	431	1019	3.5	1	34	240		315	300		1	10.0	120	7.3		100	2	230	180						180
2	14	731	1023	4.0	1	19	240		306	290		1	10.0	110	8.3		100	2	230	180					16	180

S	D	T AST	BP MB	T C	SKY	WIND SPD	WIND DIR	WL CM	GW1 CM	GW2 CM	GW3 CM	R MM	OFFSHORE WP	OFFSHORE WH	NEARSHORE WP	NEARSHORE WH	BREAKER HB	T	DIS	ANG	CV2	CD2	CV3	CD3	CV4	CD4
2	14	1031	1025	4.5	0	21	210		307	296	277	0	10.0	110	6.7		130	1	250	180						180
2	14	1331	1024	5.6	0	16	180		300	305	254	0	8.0	110	6.2		130	3	250	180					18	180
2	14	1631	1024	6.1	1	22	180		296	304	256	0	8.0	110	3.9		100	2	250	0					39	360
2	14	1931	1023	5.6	0	29	180		291	290	274	0	6.0	100	7.2		100	2	200	0					45	360
2	14	2231	1023	5.0	0	30	175		294	287	282	0	6.0	110	6.2		100	2	140	0					76	360
2	15	131	1021	5.0	4	36	160		290	285		0	4.0	110	4.6		70	2	140	20					35	180
2	15	431	1020	5.6	4	36	180		285	267		0	4.0	100	4.3		70	2	140	0					43	180
2	15	731	1018	5.6	5	31	160		284	274		0	4.0	100	4.1		100	2	30	20					90	180
2	15	1031	1014	5.6	5	37	170		293	296	277	1	5.0	140	4.9		130	2	150	25					99	360
2	15	1331	1009	5.0	5	41	180		292	291	266	1	4.5	170	6.2		150	2	250	25					47	360
2	15	1631	1005	5.0	5	37	205		287	290	271	1	4.5	120	4.6		160	2	200	25					38	360
2	15	1931	1001	5.0	5	35	210		294	298	276	1	4.5	100	5.0		100	1	150	0					55	360
2	15	2231	1003	4.4	5	36	300		296	296	278	1	5.5	60	4.7		80	1	150	0					37	360
2	16	131	1005	3.9	4	30	280		283	290	258	0	6.0	60	5.0		50	1	150	0					47	360
2	16	431	1006	3.9	4	37	290		279	266	253	0	7.0	50	4.7		30	1	150	0					61	360
2	16	731	1007	3.3	5	36	290		276	268	252	0	7.0	50	3.4		30	1	100	0					38	360
2	16	1031	1009	3.3	1	39	285		283	272	257	0	7.0	50	3.2		50	3	40	0					14	360
2	16	1331	1009	3.3	1	37	290		280	265	249	0	7.0	50	3.8		50	3	60	0					21	360
2	16	1631	1010	2.8	4	34	285		271	269	253	0	7.0	30	2.7		50	3	90	5					27	360
2	16	1931	1011	2.8	2	36	290		274	260	256	0	7.0	30	5.4		30	3	90	0					19	360
2	16	2231	1012	2.8	3	37	300		275	269	264	0	7.0	40	6.4		30	2	10	0					11	360
2	17	131	1013	2.8	4	29	300		271	260	255	0	7.0	30	3.3		30	1	10	0					6	360
2	17	431	1013	2.8	5	30	295		269	266	252	0	7.0	30	2.8		30	1	10	0					22	360
2	17	731	1014	2.8	5	28	300		267	261	253	0	7.0	30	4.2		50	1	40	175					5	360
2	17	1031	1015	2.8	3	28	300		276	275	259	0	7.0	30	6.9		30	3	10	0					1	360
2	17	1331	1014	2.8	4	30	295		279	271	262	0	7.0	30	5.3		30	3	10	0					5	360
2	17	1631	1015	2.2	1	26	280		274	268	255	1	7.0	30	5.7		30	3	10	0					14	360
2	17	1931	1014	2.2	1	22	260		275	268	259	0	4.0	30	4.6		30	3	10	175					8	360
2	17	2231	1012	2.2	1	25	280		275	273	261	0	5.0	30	5.8		30	3	10	175					5	360
2	18	131	1011	1.7	2	19	265		276	266	261	0	5.0	30	3.9		30	3	10	175					4	360
2	18	431	1011	2.2	1	18	260		270	264	247	0	5.0	30	2.6		20	2	10	0					3	360
2	18	731	1010	2.2	1	15	240		269	262	247	0	5.0	30	2.6		20	2	10	0					14	360
2	18	1031	1009	2.2	1	23	210		265	260	242	0	2.0	40	2.9		20	1	10	30					24	360
2	18	1331	1006	3.3	5	31	250		278	269	271	0	2.5	50	3.3		40	2	10	15					19	360
2	18	1631	1005	2.8	5	35	260		277	271	261	0	2.5	60	2.2		30	2	10	15					14	360
2	18	1931	1005	2.2	4	34	270		274	264	259	0	2.5	50	4.0		30	2	10	10					20	360
2	18	2231	1006	2.2	1	35	280		298	272	263	0	5.0	40	4.2		20	2	10	10					19	360
2	19	131	1006	2.2	1	37	290		279	274	269	0	5.5	30	4.8		40	3	10	5					7	360
2	19	431	1007	2.2	2	34	290		270	264	246	0	6.0	30	2.6		40	3	10	0					7	360
2	19	731	1009	2.2	4	27	290		266	253	257	0	6.0	30	2.0		30	3	10	0					4	360

S	D	T	BP	T	SKY	WIND		WL	GW1	GW2	GW3	R	OFFSHORE		NEARSHORE		BREAKER				CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
2	19	1031	1010	2.2	3	31	290		269	264	261	0	6.0	30	5.7		30	3	10	0					3	360
2	19	1331	1010	2.0	3	35	285		274	277	254	0	6.0	30	7.5		40	3	10	0					7	360
2	19	1631	1011	2.0	3	30	270		273	267	225	0	6.0	30	6.5		30	3	10	0					2	360
2	19	1931	1013	1.5	1	20	310		276	278	225	0	6.0	30	7.7		30	3	10	0					17	180
2	19	2231	1014	1.0	1	30	300		281	282	225	0	6.0	30	8.7		10	3	10	0					9	180
2	20	131	1015	1.0	1	22	300		283	279		0	6.0	20	5.1		30	3	10	0					13	180
2	20	431	1016	1.0	1	18	300		279	281		0	5.5	20	2.7		30	3	10	0					3	180
2	20	731	1017	1.0	3	18	300		277	276	259	0	6.0	20	2.1		30	3	10	0					4	180
2	20	1031	1016	.5	5	16	285		269	269		0	6.0	20	5.9		30	3	10	0					8	180
2	20	1331	1016	1.0	5	18	270		272	271	257	0	6.0	20	5.5		20	3	10	0					6	180
2	20	1631	1016	1.0	5	15	275		273	268	264	0	5.5	20	4.9		30	3	10	0					1	180
2	20	1931	1016	1.0	2	8	315		275	269	259	0	5.5	20	7.1		20	3	10	0					3	180
2	20	2231	1015	1.0	2	7	10		276	265	277	0	5.5	20	5.5		20	3	10	0					4	180
2	21	131	1014	1.0	5	9	20		316	269	287	0	2.0	30	4.6		20	3	10	150					30	180
2	21	431	1013	1.0	5	17	50		350	272	370	0	2.5	40	2.6		30	3	20	150					31	180
2	21	731	1010	.5	5	35	50		360	297	370	0	3.0	70	3.5		50	1	50	160					45	180
2	21	1031	1008	.5	5	52	55		278	274		0	5.0	140	4.2		100	2	280	140					71	180
2	21	1331	1000	.5	5	67	55		301	302		0	5.5	210	5.7		150	2	280	140						
2	21	1631	995	.5	5	71	60		336	307		0	6.0	260	6.3		200	2	400	140					123	180
2	21	1931	997	.5	5	60	60		343	311		0	9.0	300	7.5		200	2	300	0						
2	21	2231	996	0	5	52	60		342	306		0	9.0	260	8.0		150	2	250	0						
2	22	131	997	0	5	49	60		345	312		0	9.0	250	7.3		100	2	250	0						
2	22	431	998	0	5	40	60		339	307	222	0	9.0	240	8.2		100	2	200	0						
2	22	731	1001	0	5	35	30		310	288		0	7.0	210	6.2		150	2	200	170						
2	22	1031	1004	0	5	35	30		305	293		1	7.0	180	6.8		100	2	200	165					58	180
2	22	1331	1005	.5	5	38	30		310	297		0	5.5	180	6.4		90	2	200	165					56	180
2	22	1631	1008	.5	5	32	30		315	294		0	5.5	140	6.5		80	2	200	170					79	180
2	22	1931	1011	.5	5	37	30		303	285		0	5.5	140	7.5		80	2	200	170					103	180
2	22	2231	1014	.5	5	37	30		299	292		0	5.0	140	7.3		80	2	200	0					74	180
2	23	131	1016	.5	0	30	25		289	288		0	5.5	110	4.7		80	2	200	170						180
2	23	431	1019	.5	5	30	15		297	285		0	5.0	100	5.1		80	2	200	160						180
2	23	731	1021	.5	5	26	5		283	264		0	7.0	100	6.0		80	2	230	0					50	180
2	23	1031	1024	1.0	5	29	345		285	269		0	7.0	100	6.6		80	2	200	170					15	180
2	23	1331	1023	1.0	5	23	350		284	269		0	7.0	80	6.8		60	1	100	0					40	180
2	23	1631	1024	1.0	3	15	345		282	269		0	6.5	70	6.4		80	2	100	0					35	180
2	23	1931	1024	.5	3	10	320		280	268		0	6.5	70	4.4		60	2	100	0						180
2	23	2231	1024	.5	3	7	300		279	262		0	6.5	60	4.0		60	2	80	0						180
2	24	131	1024	.5	3	8	255		267	263	272	0	7.0	70	4.2		50	2	90	0					8	180
2	24	431	1023	.5	4	11	210		280	263		0	7.0	60	3.2		50	2	90	0					3	180
2	24	731	1022	.5	4	16	210		248	263	240	0	5.5	70	6.1		40	2	90	0					6	360

S	D	T	BP	T	SKY	WIND		WL	GW1	GW2	GW3	R	OFFSHORE		NEARSHORE		BREAKER				CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
2	24	1031	1021	.5	5	24	190		272	257		1	3.5	80	4.7		30	3	50	5					39	360
2	24	1331	1018	.5	5	26	200		268	258		0	4.5	60	5.5		30	2	50	5					43	360
2	24	1631	1015	.5	5	40	180		272	265		0	5.0	80	6.0		20	2	40	10					65	360
2	24	1931	1013	0	5	36	180		278	280		1	4.5	100	4.8		40	2	60	10						360
2	24	2231	1010	.5	5	21	210		272	268		1	5.0	110	5.3		60	2	90	15						360
2	25	131	1008	0	5				267	267		1	4.5	60	3.3		50	2	90	15					17	360
2	25	431	1008	0	5				265	280		1	5.5	60	4.0		50	2	90	15					22	360
2	25	731	1009	0	5				271	276	207	0	5.0	50	3.2		40	2	90	10					7	360
2	25	1031	1011	0	5				275	268		1	6.5	30	7.0		30	2	30	0					13	360
2	25	1331	1011	0	5				273	266		2	5.0	30	4.2		30	2	30	0					17	180
2	25	1631	1013	0	5				279	271		2	5.5	40	5.2		20	2	10	0					37	180
2	25	1931	1013	0	5				281	275		2	4.5	60	4.5		40	2	40	0					34	180
2	25	2231	1012	0	5				276	264		2	4.5	60	5.0		50	2	60	0						180
2	26	131	1011	0	5				260	262		2	4.5	100	2.8		50	2	80	160					47	180
2	26	431	1008	0	5		35		260	275		2	4.5	100	3.7		100	2	90	155						180
2	26	731	1004	0	5		30		281	297		2	4.5	100	4.1		100	2	90	150					111	180
2	26	1031	999	1.0	5		50		289	295		2	5.0	110	4.8		60	2	120	150					68	180
2	26	1331	989	5.0	5		120		297	299		4	4.5	100	4.0		70	2	120	0					32	180
2	26	1631	984	7.0	3		160		316	322		0	1.0	120	5.1		180	2	400	10					66	360
2	26	1931	984	2.0	3		155		338	304		0	6.0	180	5.7		170	2	300	10						360
2	26	2231	986	-3.0	5		200		313	291		0	6.0	130	7.4		150	2	300	10						360
2	27	131	986	-3.0	5		165		288	300		0	5.5	160	7.3		150	2	340	30					83	360
2	27	431	985	-3.0	5		165		293	293		0	5.5	150	7.1		150	2	340	30						360
2	27	731	983	-2.0	5		165		312	294		0	5.5	140	6.6		100	2	300	20						360
2	27	1031	988	-1.0	5		225		289	280		0	5.5	70	5.9		50	2	60	5					42	360
2	27	1331	990	-2.0	4		265		286	278		0	7.0	50	8.3		40	2	50	0					18	360
2	27	1631	995	-3.0	4		270		296	278		0	7.5	30	9.7		30	3	20	0					23	360
2	27	1931	997	-1.0	5		265		285	286		0	7.5	40	5.8		40	3	20	0					26	360
2	27	2231	999	-1.0	5		260		286	280		0	8.0	30	4.6		40	3	20	0					26	360
2	28	131	1001	-2.0	5		255		280	281		0	9.0	40	3.0		20	3	30	0					24	360
2	28	431	1003	-2.0	5		255		281	276		0	9.5	30	3.2		40	3	30	0					17	360
2	28	731	1005	-1.0	4		255		294	286		0	8.0	20	5.1		30	3	10	0					12	360
2	28	1031	1009	-0.5	5		260		288	287		0	6.5	30	5.5		10	3	10	0					25	360
2	28	1331	1009	.5	4		300		283	286		0	7.0	20	3.4		10	3	10	0					6	360
2	28	1631	1012	.5	5		320		282	279		0			4.6		10	3	10	0						180
2	28	1931	1014	-0.5	4		330		290	290		0			8.0		10	3	10	0						180
2	28	2231	1014	-0.5	3		15		289	286		0			3.9		20	3	10	0					8	180
2	29	131	1015	0	5		35		283	272		0			3.7		40	3	90	160					19	180
2	29	431	1016	-1.0	4		20		277	271		0			3.6		30	3	60	170					29	180
2	29	731	1017	-1.0	5		40		281	281		0			3.3		40	3	10	150					23	180

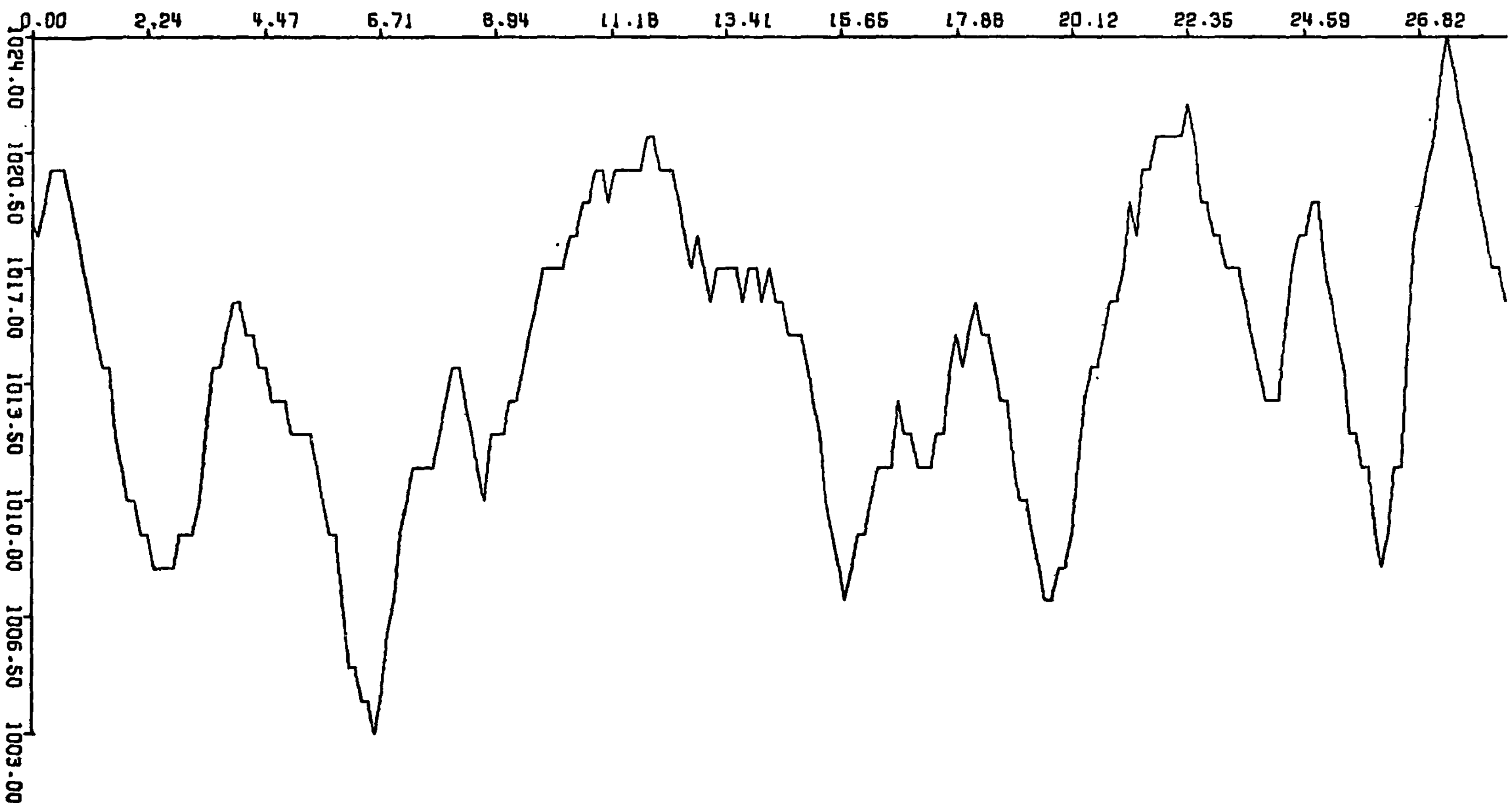
S	D	T	BP	T	SKY	WIND		WL	GW1	GW2	GW3	R	OFFSHORE		NEARSHORE		BREAKER				CV2	CD2	CV3	CD3	CV4	CD4
		AST	MB	C		SPD	DIR	CM	CM	CM	CM	MM	WP	WH	WP	WH	HB	T	DIS	ANG						
2	29	1031	1018	-0.5	5		40		292	294		0			6.2		30	3	10	150					71	180
2	29	1331	1018	-0.5	5		45		292	289		0			4.8		30	3	60	170					45	180
2	29	1631	1020	-0.5	5		30		285	291		0			5.5		40	3	60	170					50	180
2	29	1931	1022	-2.0	5		15		296	297		0			4.3		50	3	90	170						180
2	29	2231	1024	-2.0	5		15		292	299		0			5.1		50	3	90	170						180
2	30	131	1024	-2.0	5		15		282	291		0			4.2		60	1	60	160					35	180
2	30	431	1025	-2.0	5		350		281	281		0			3.0		70	1	60	170					27	180
2	30	731	1027	-3.0	5		325		277	275		0			4.5		100	3	60	160					40	180
2	30	1031		-4.5	5		310		292	303		0			6.4		80	3	60	175					43	180

DATA PLOTS

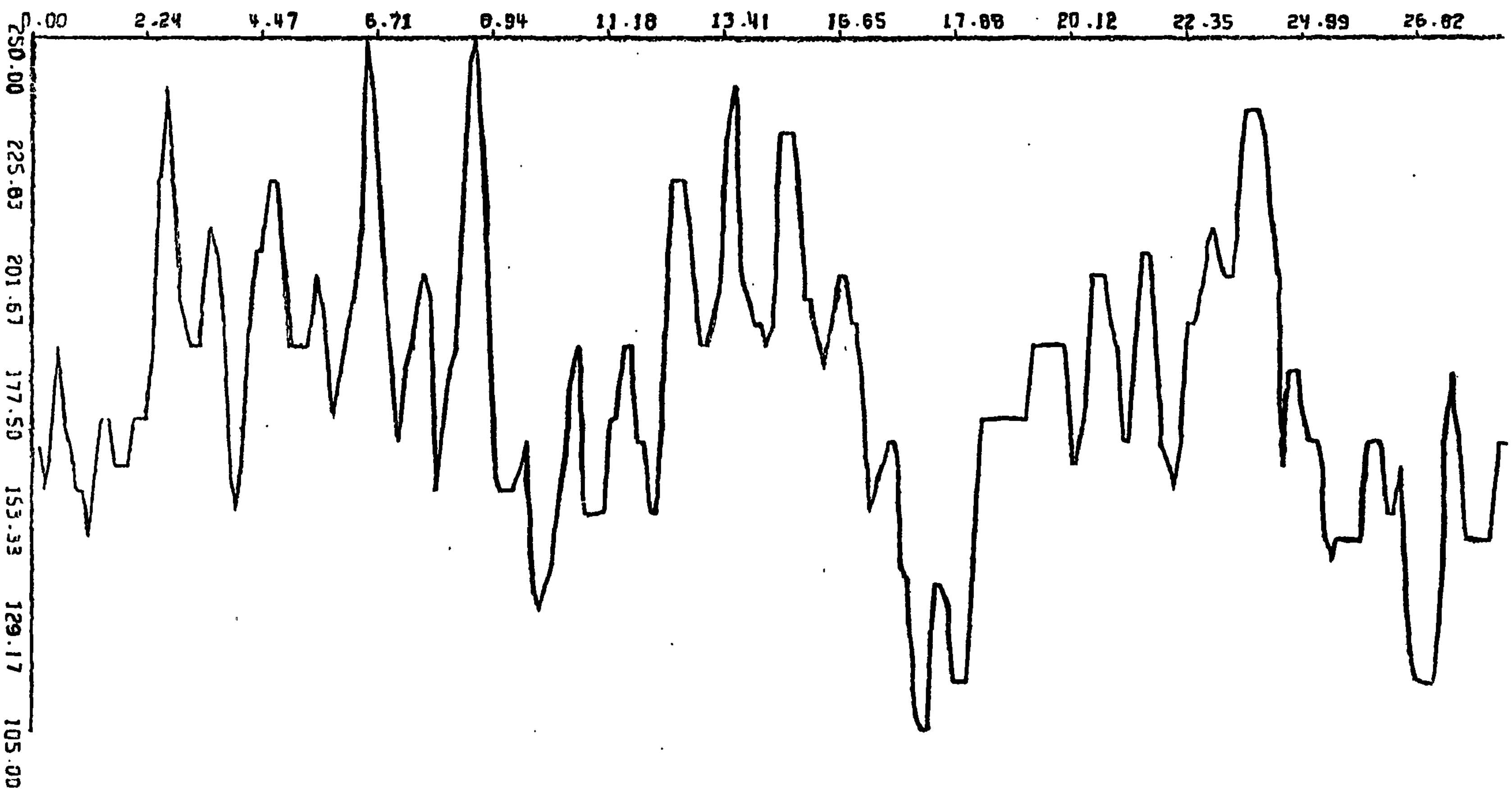
Summer west

BARØMETRIC PRESSURE S1

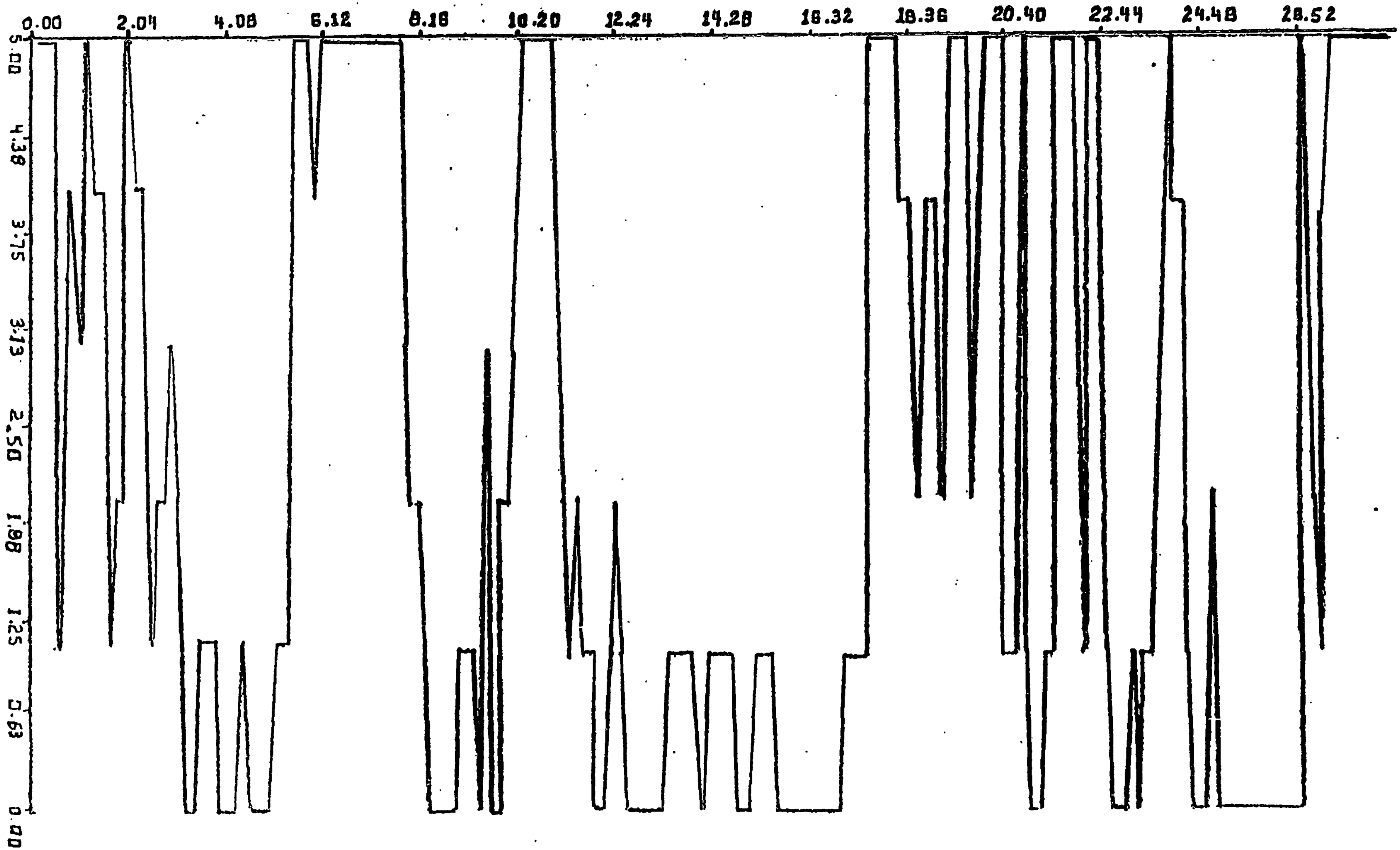
(mb)



AIR TEMPERATURE S1
(^{o}C x10)

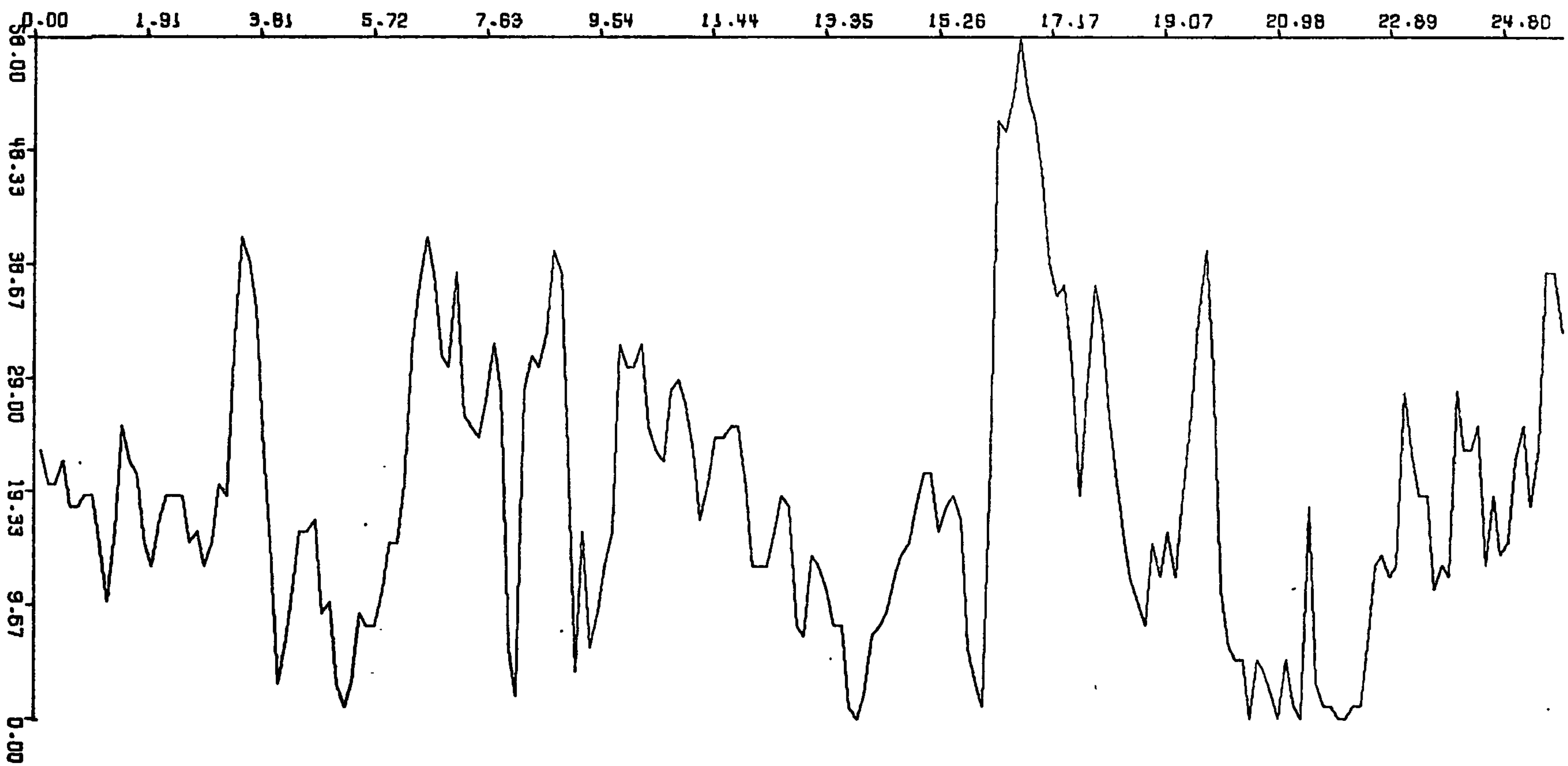


SKY CONDITION S1

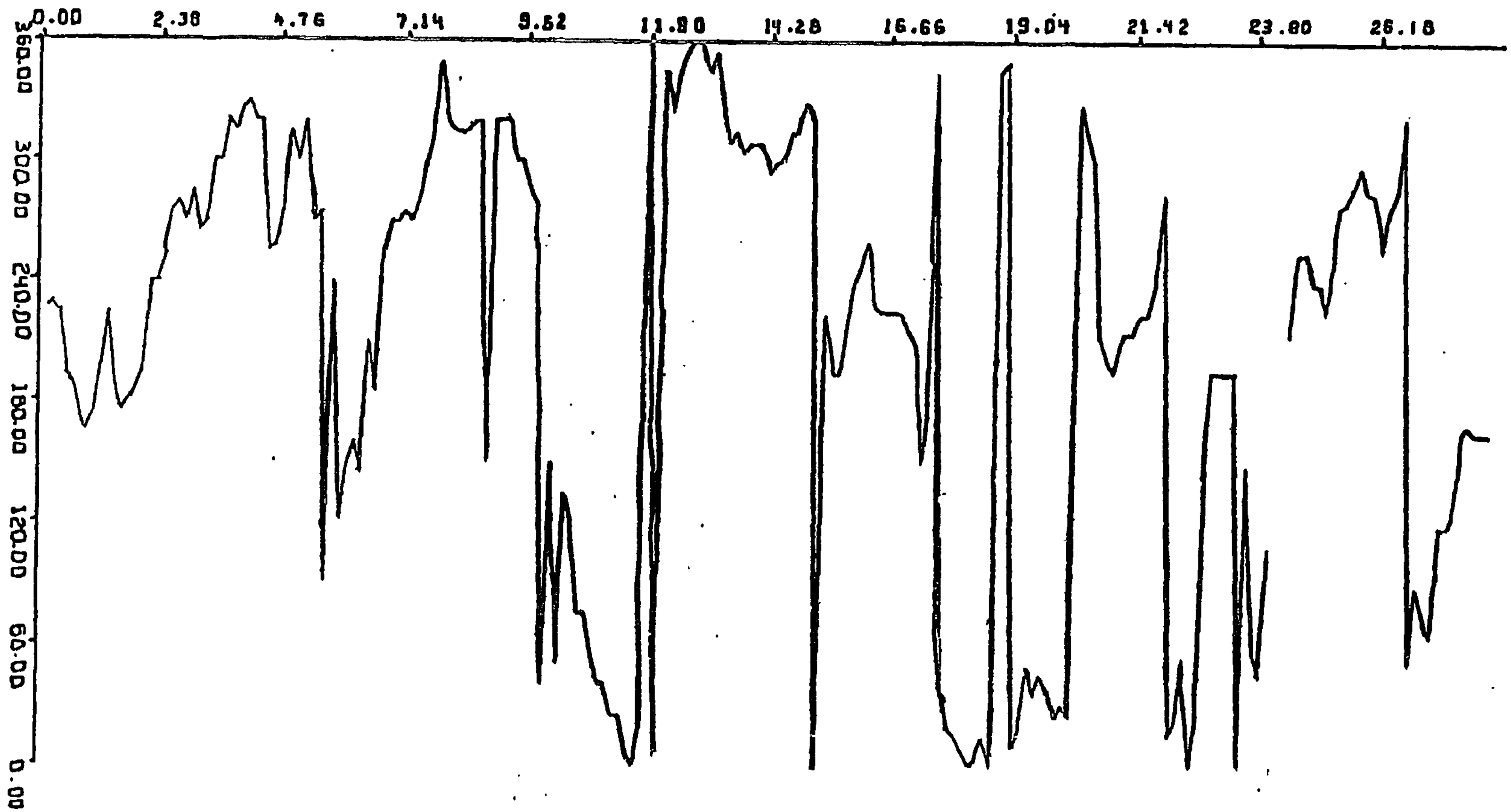


WIND SPEED S1

(km/hr)

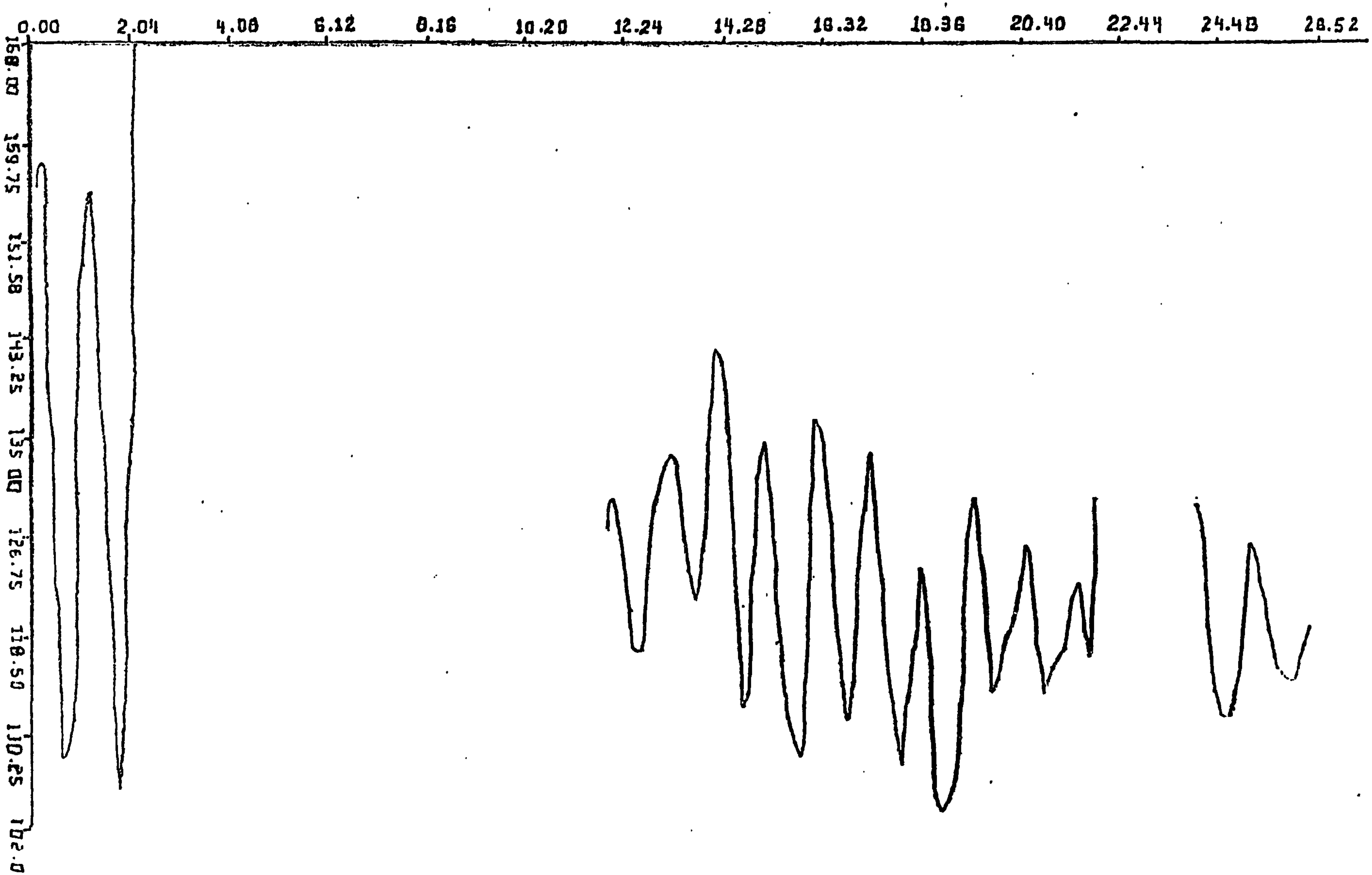


WIND DIRECTION S1
(°)

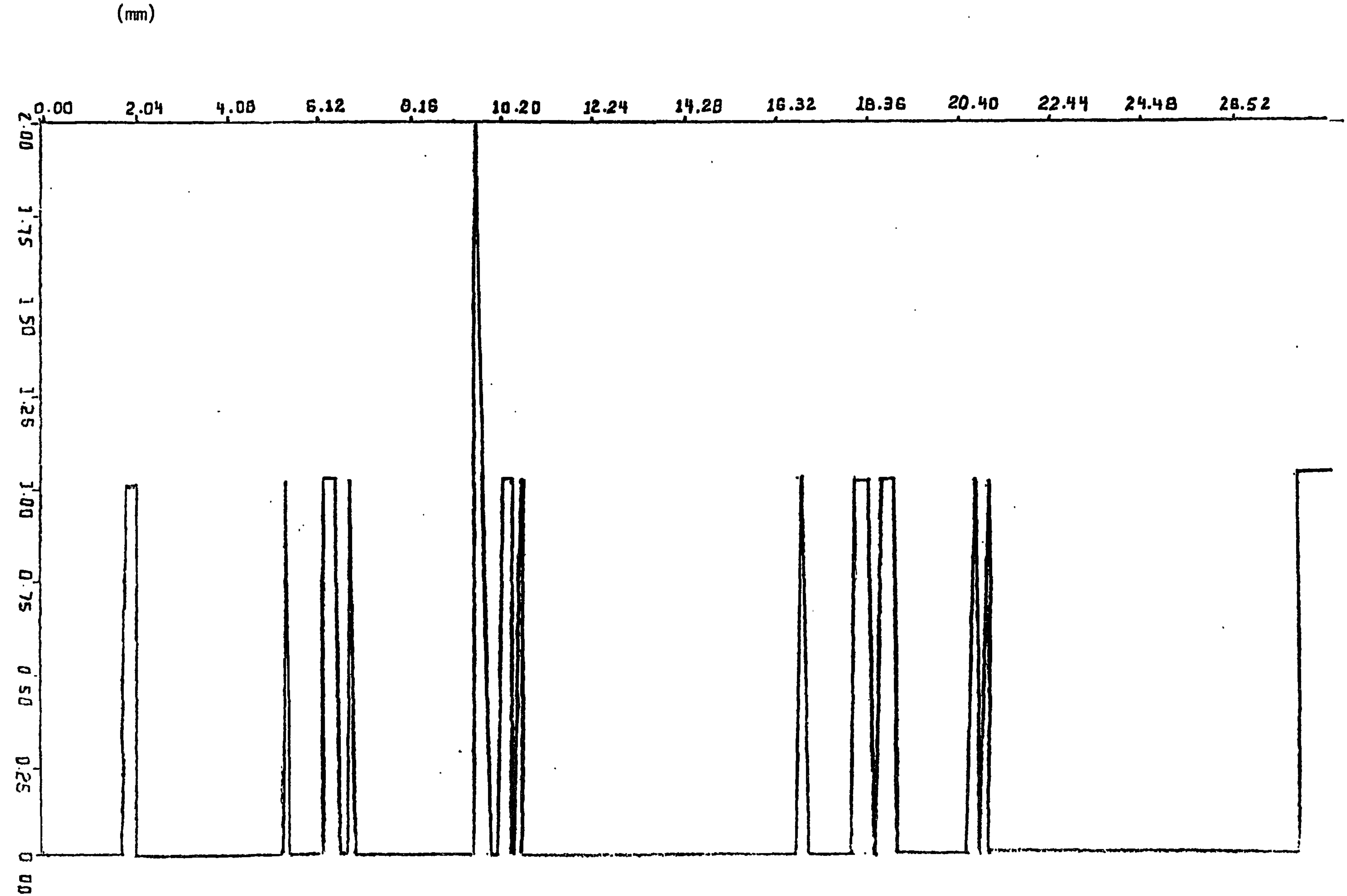


WATER LEVEL S1

(cm)

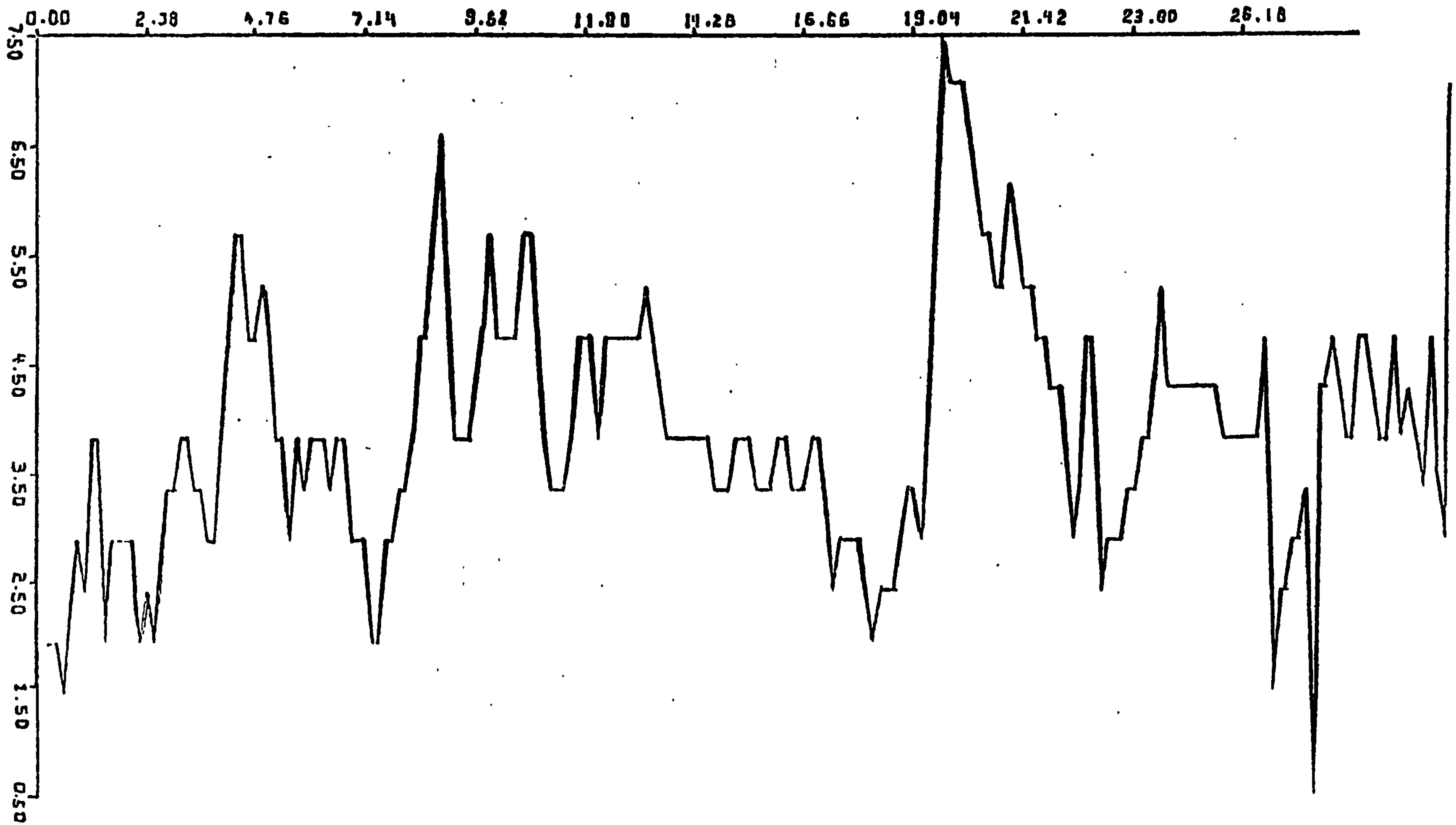


RAINFALL S1



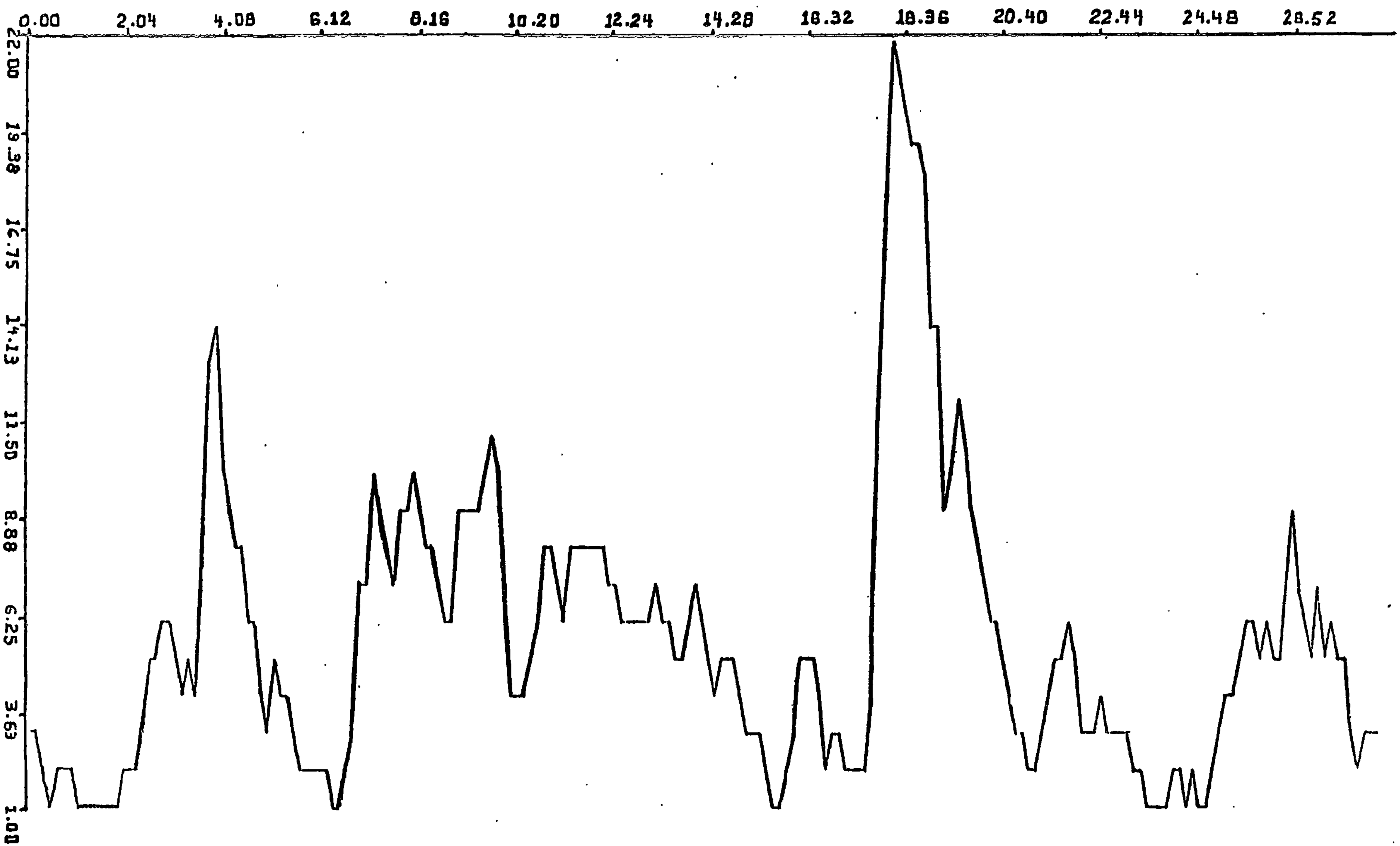
52

OFFSHORE WAVE PERIOD S1
(sec)

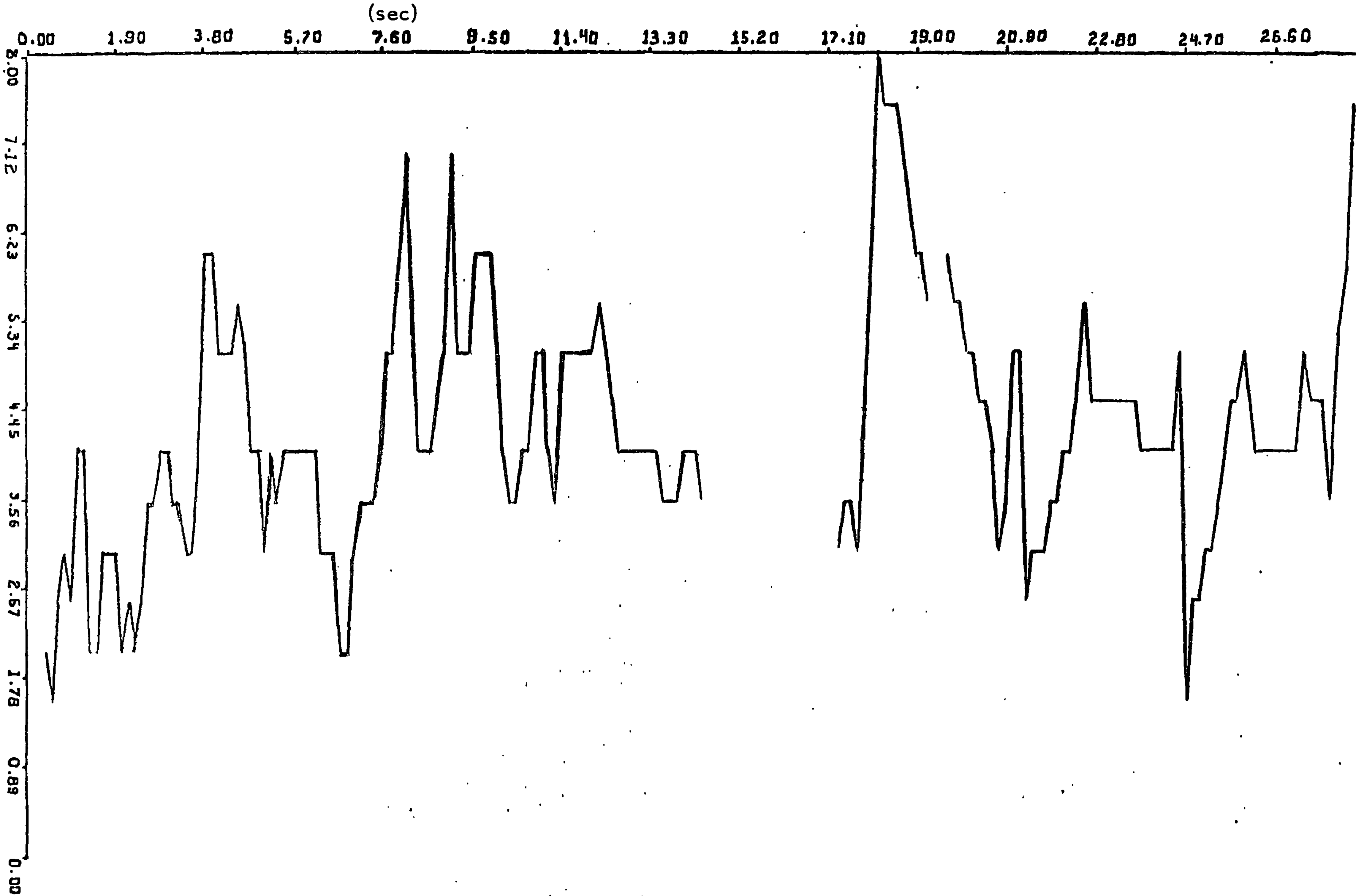


53

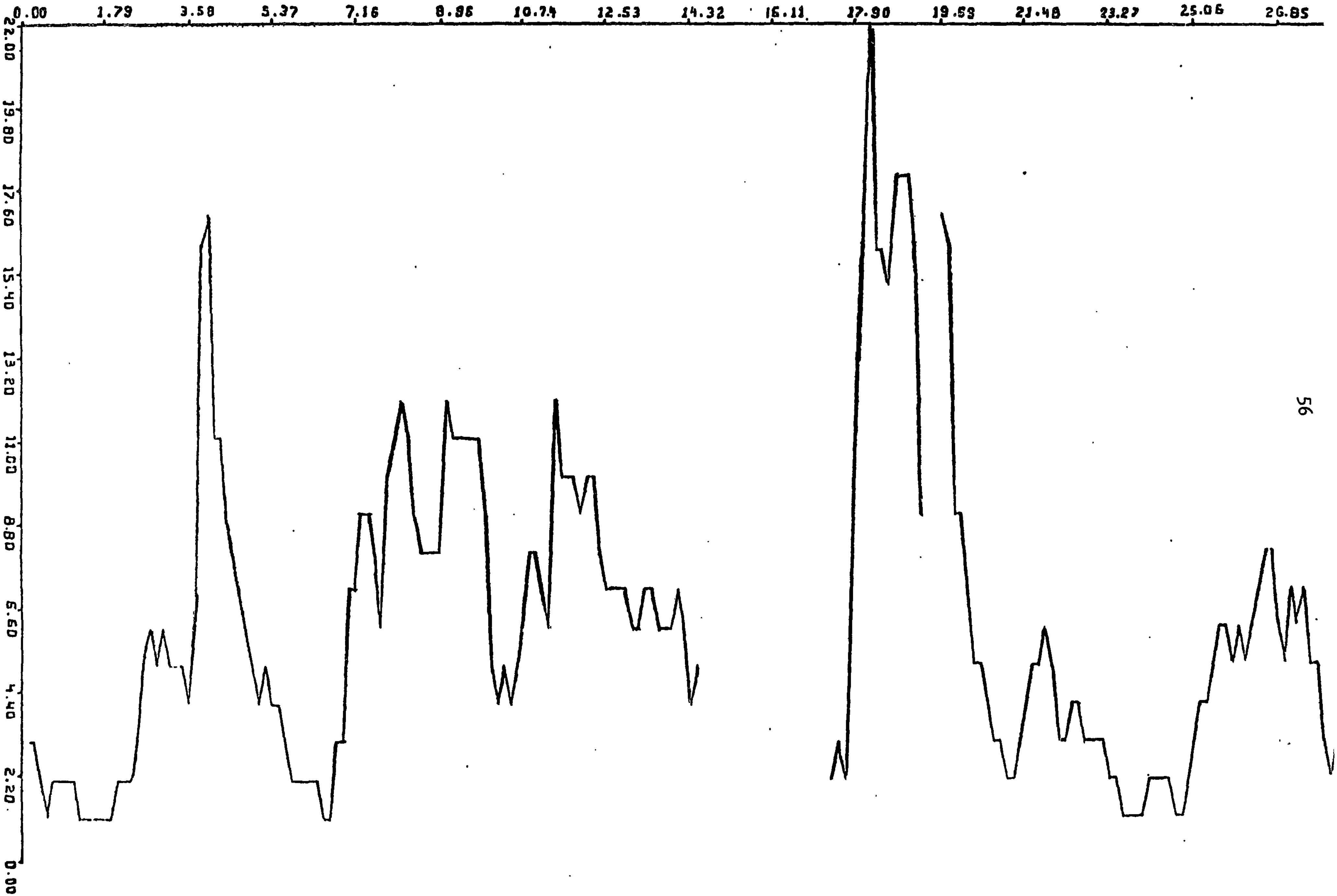
OFFSHORE WAVE HT. S1
(decimeters)



NEARSHORE WAVE PERIOD S1

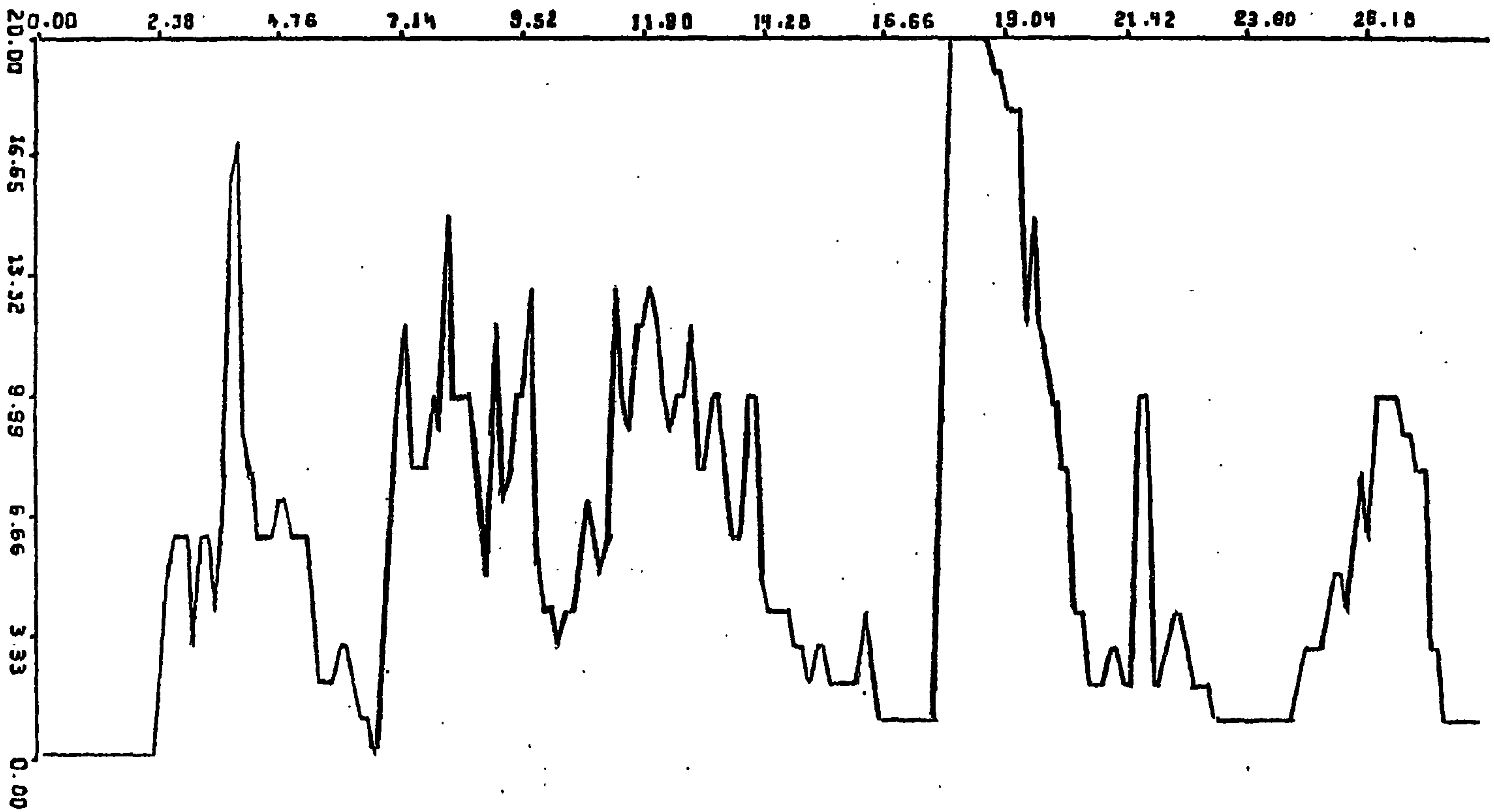


NEARSHORE WAVE HT. S1
(decimeters)

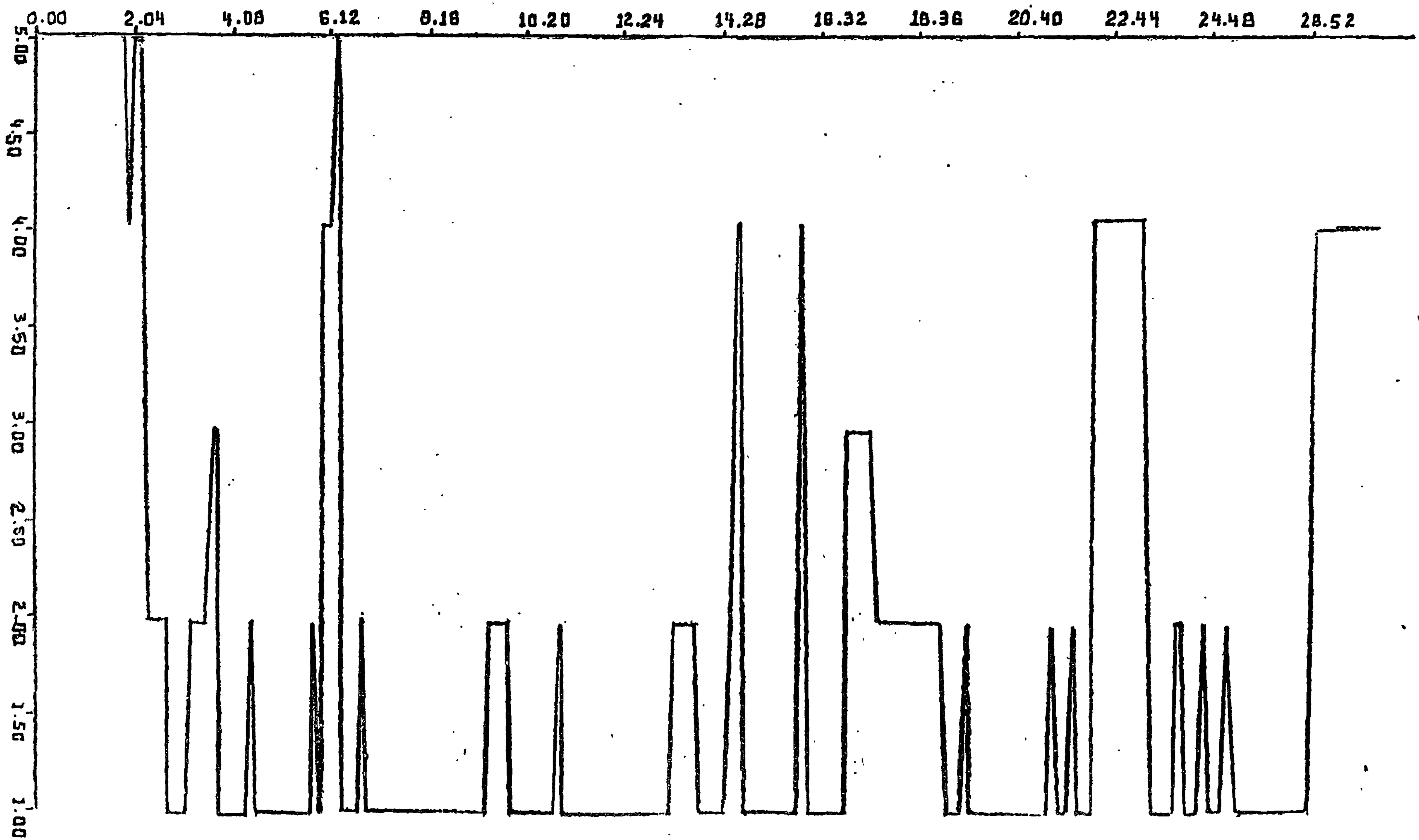


BREAKER HT S1

(decimeters)

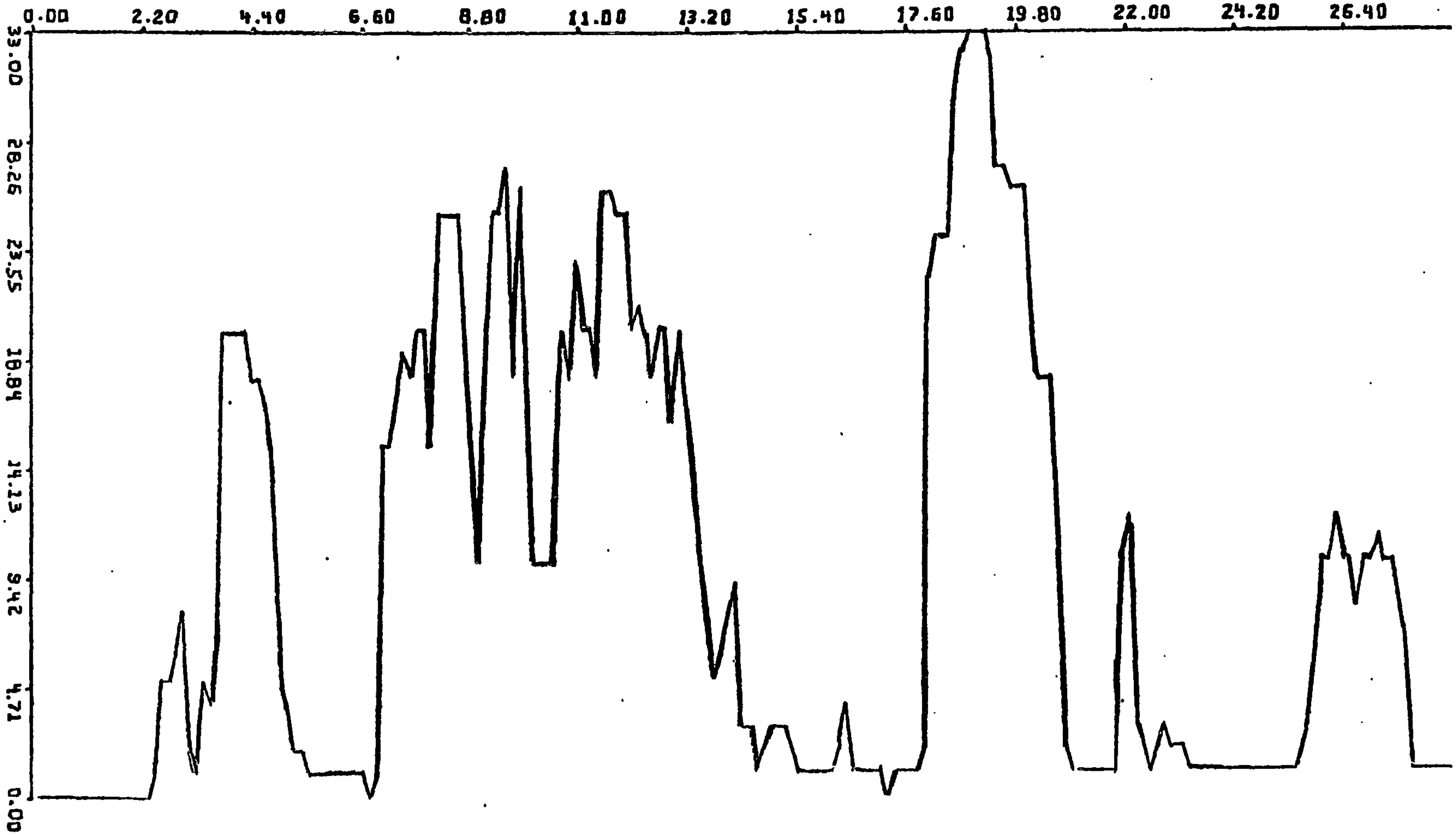


BREAKER TYPE S1



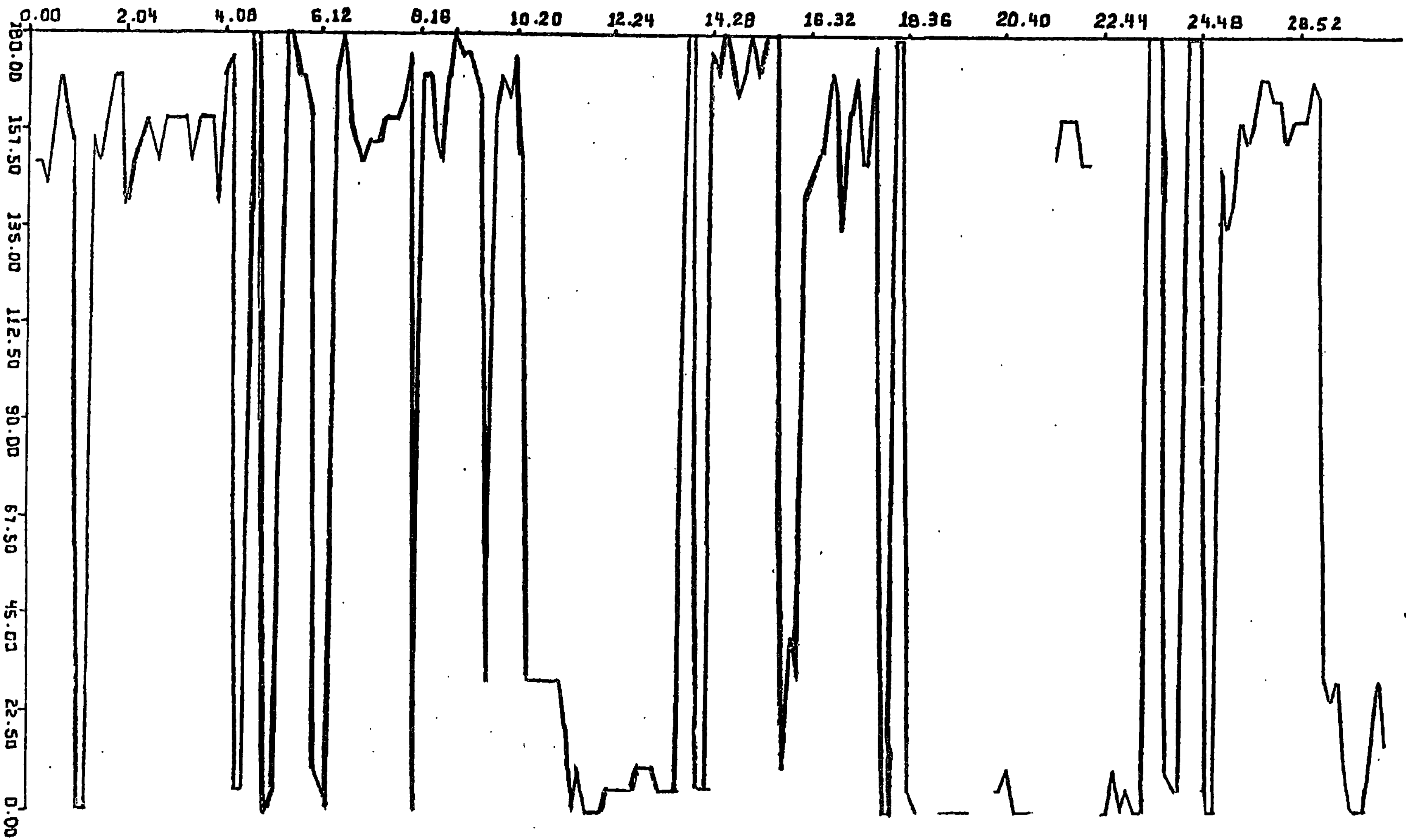
BREAKER DISTANCE S1

(decameters)



BREAKER ANGLE S1

(°)



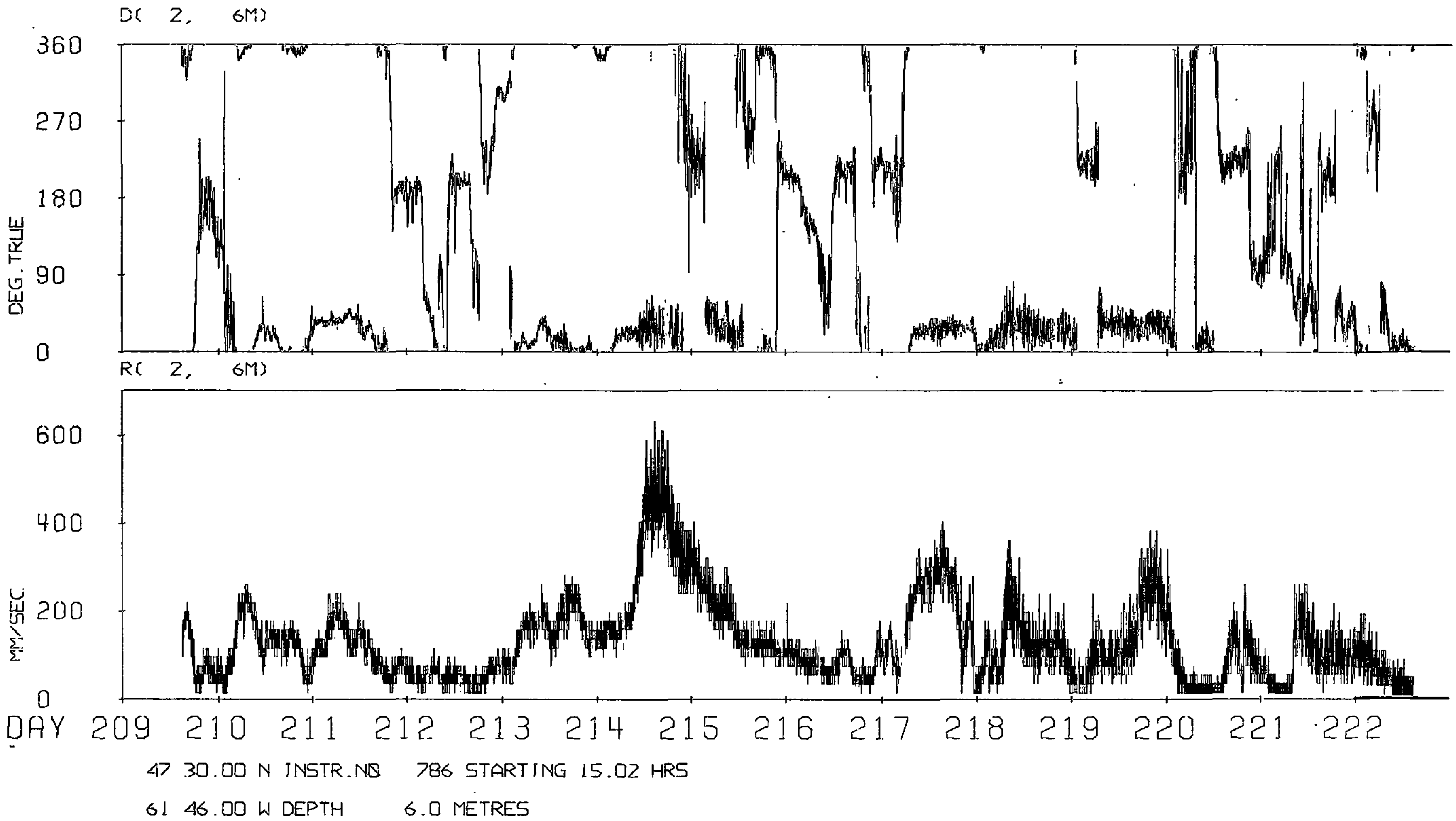
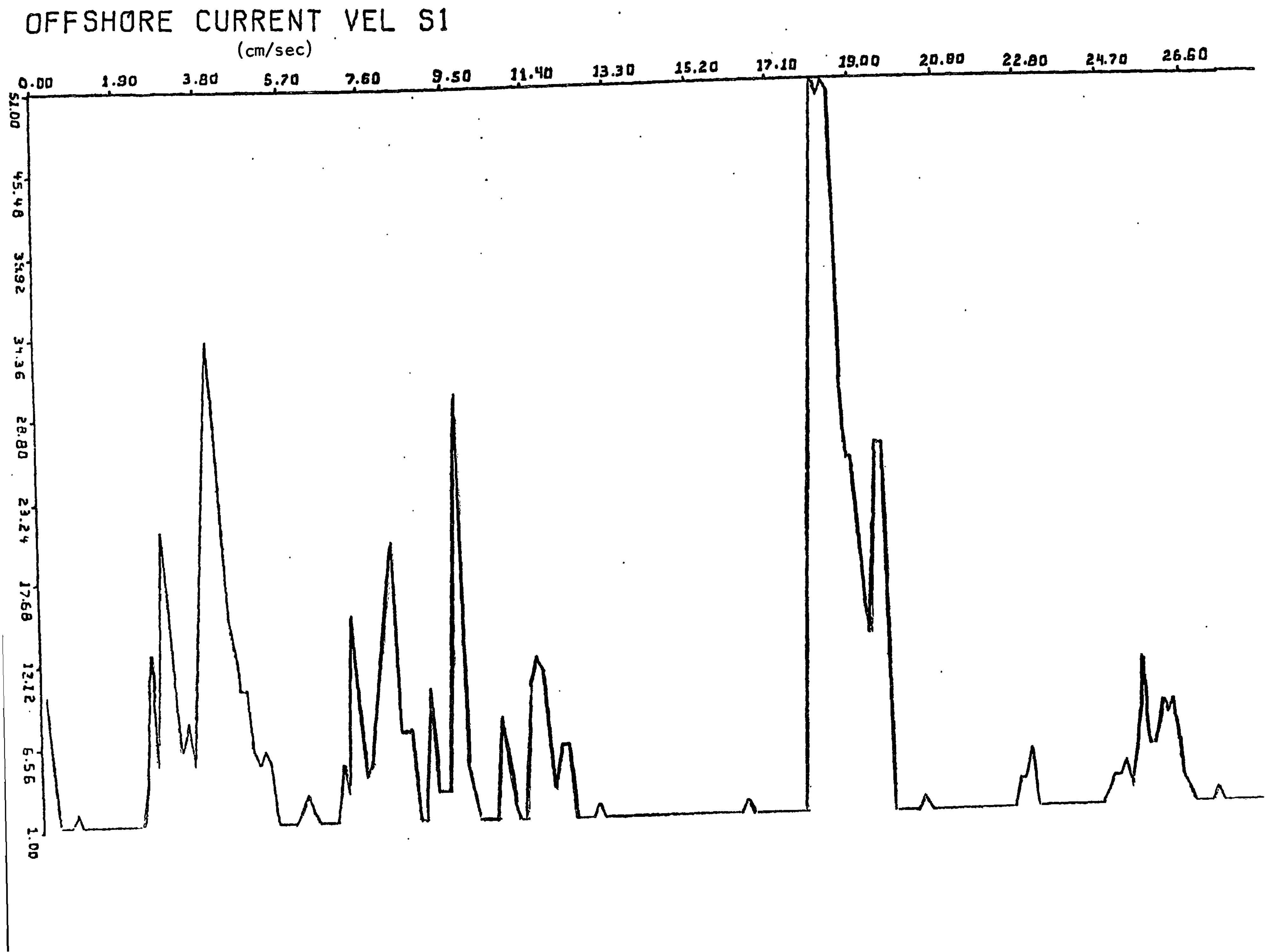
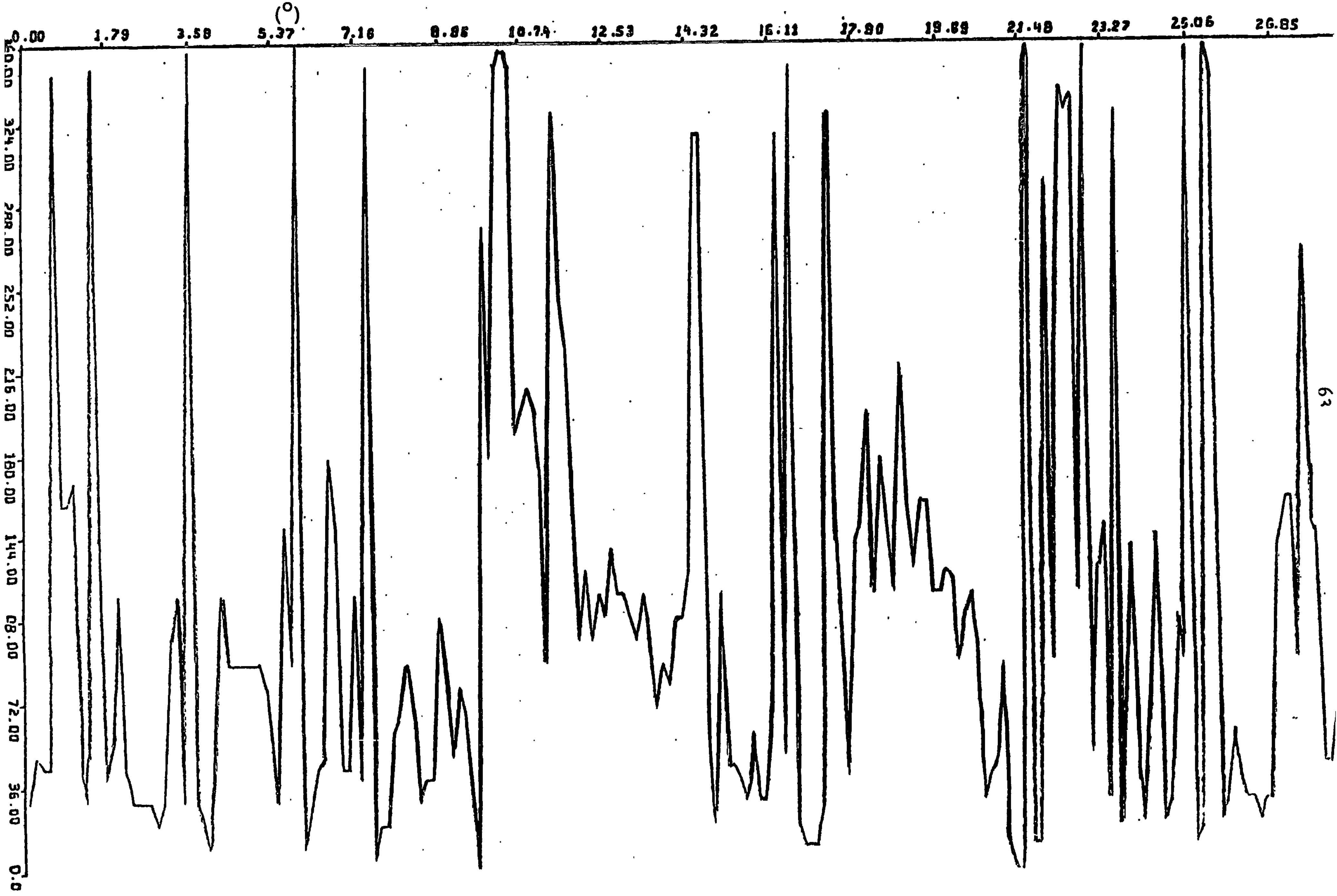


Figure 2.4 Plot of direction and velocity data from the Aanderaa current meter at the #1 wave tower on the west site in the summer phase. Dates are given as Julian days (209 = July 28: 222 = August 10).



OFFSHORE CURRENT VEL S1
(cm/sec)
0.00
1.90
3.80
5.70
7.60
9.50
11.40
13.30
15.20
17.10
19.00
20.90
22.80
24.70
26.60
51.00
45.48
39.92
34.36
28.80
23.24
17.68
12.12
6.56
1.00

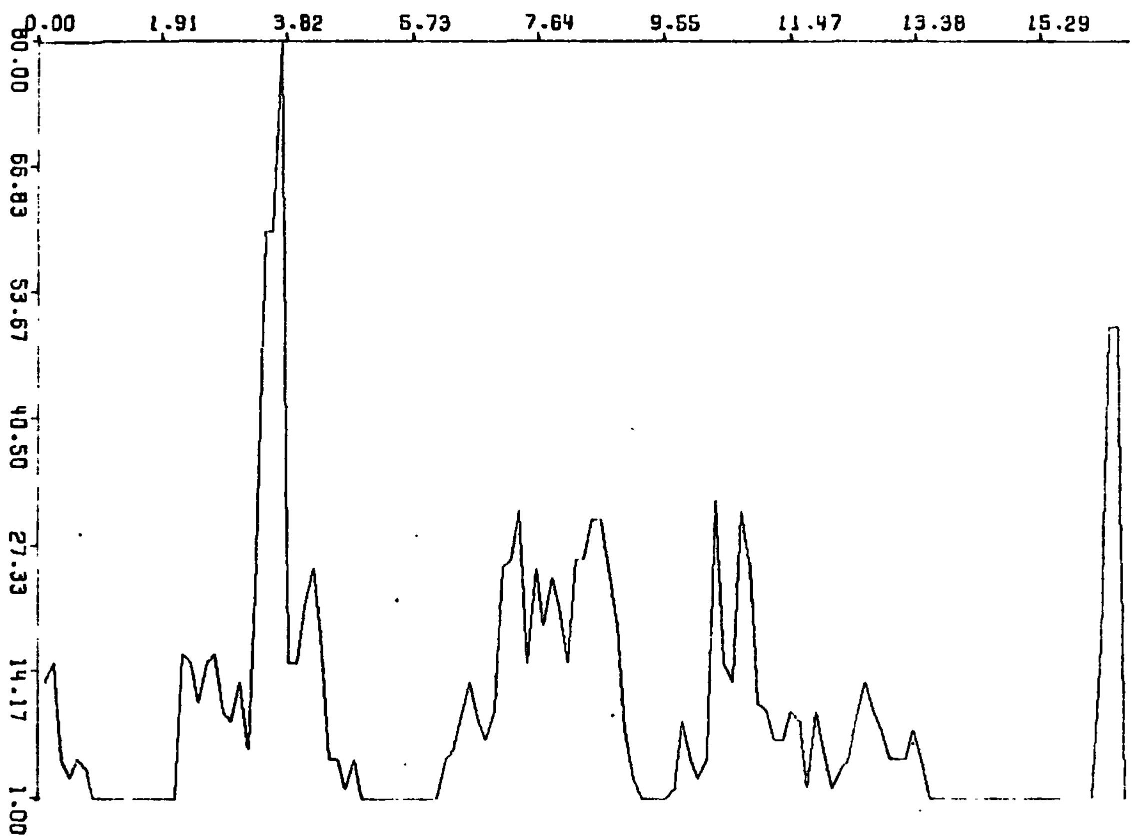
OFFSHORE CUR DIR S1



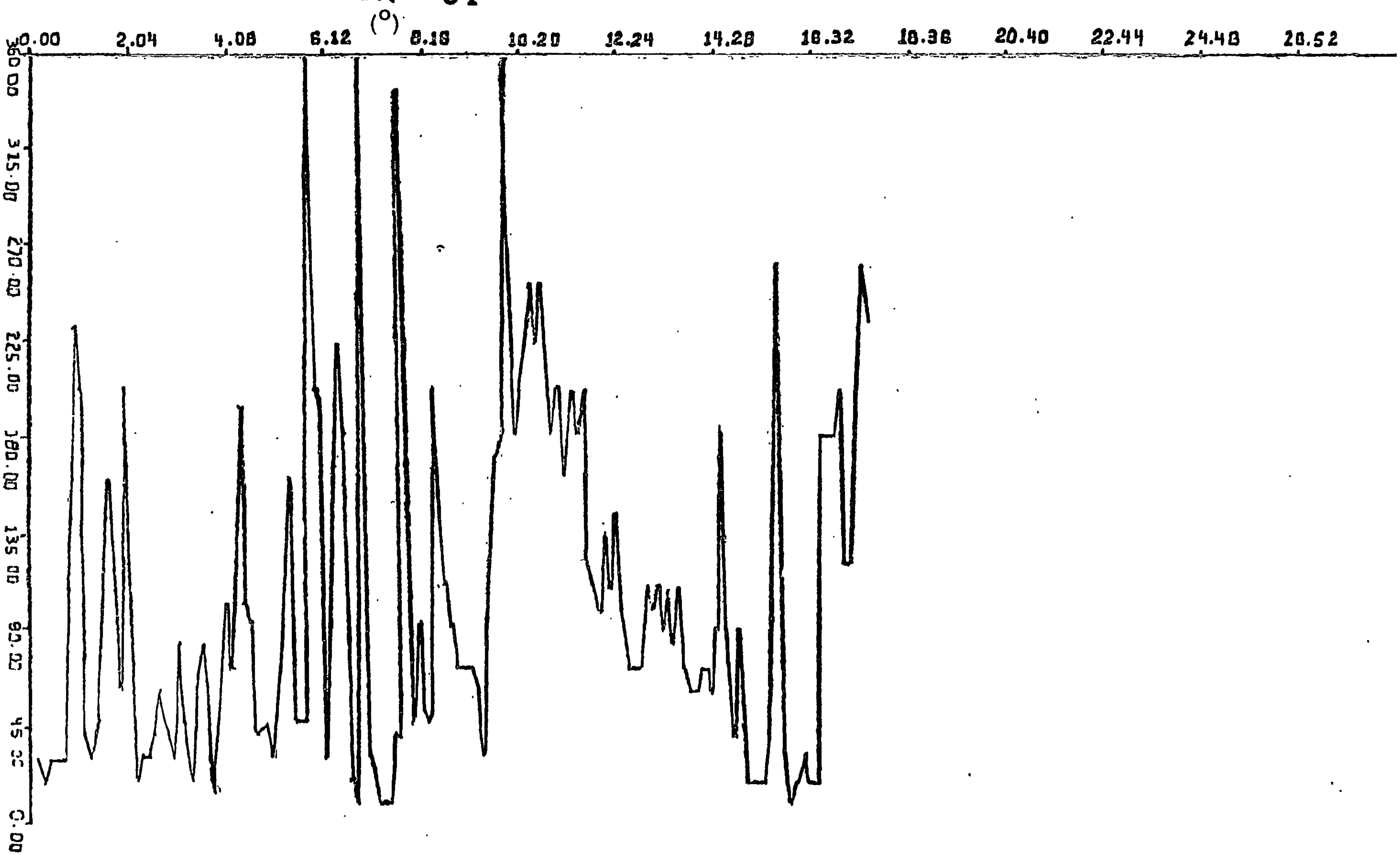
63

NEARSHORE CUR VEL S1

(cm/sec)



NEARSHORE CUR DIR S1

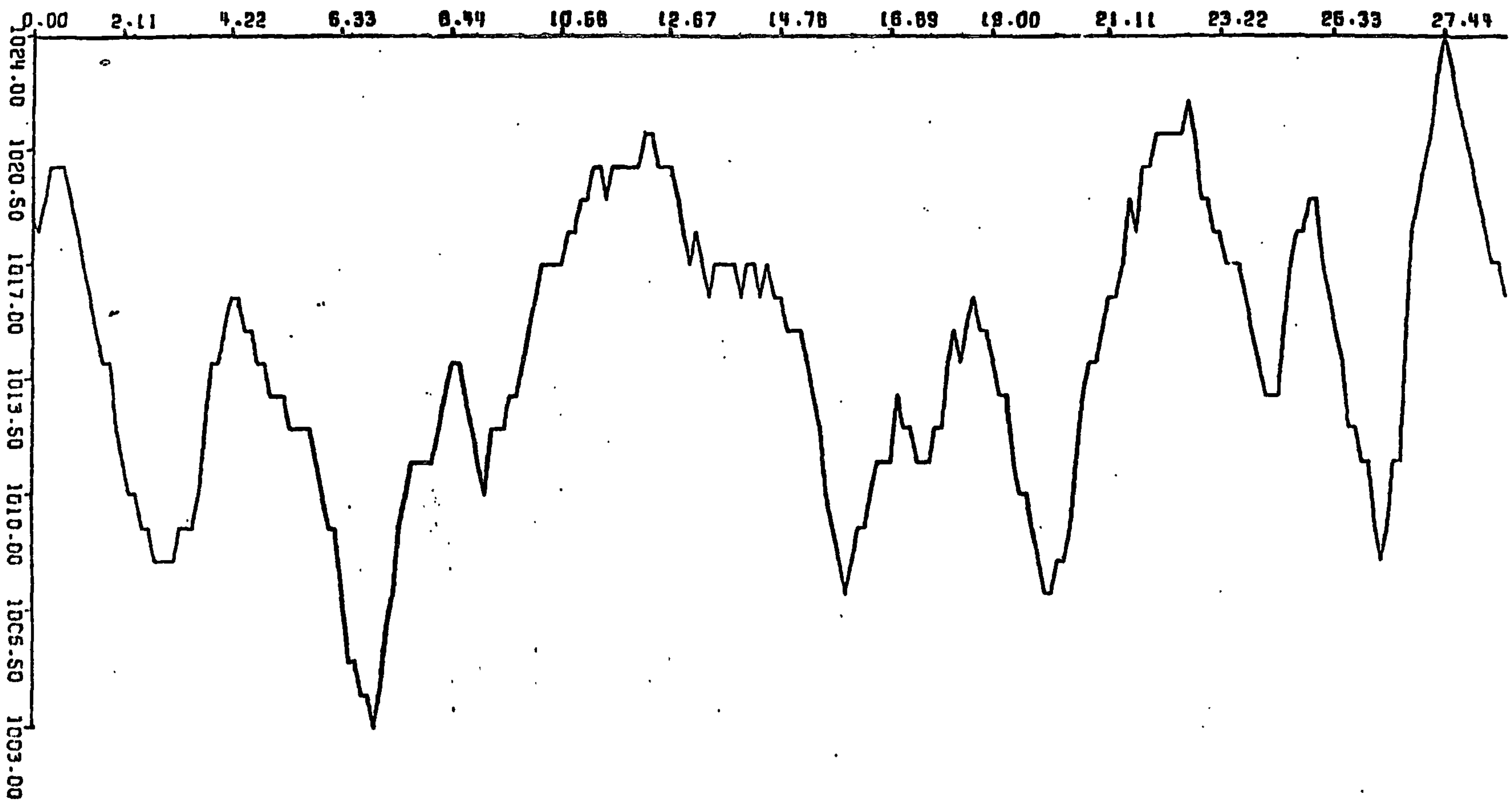


DATA PLOTS

Summer east

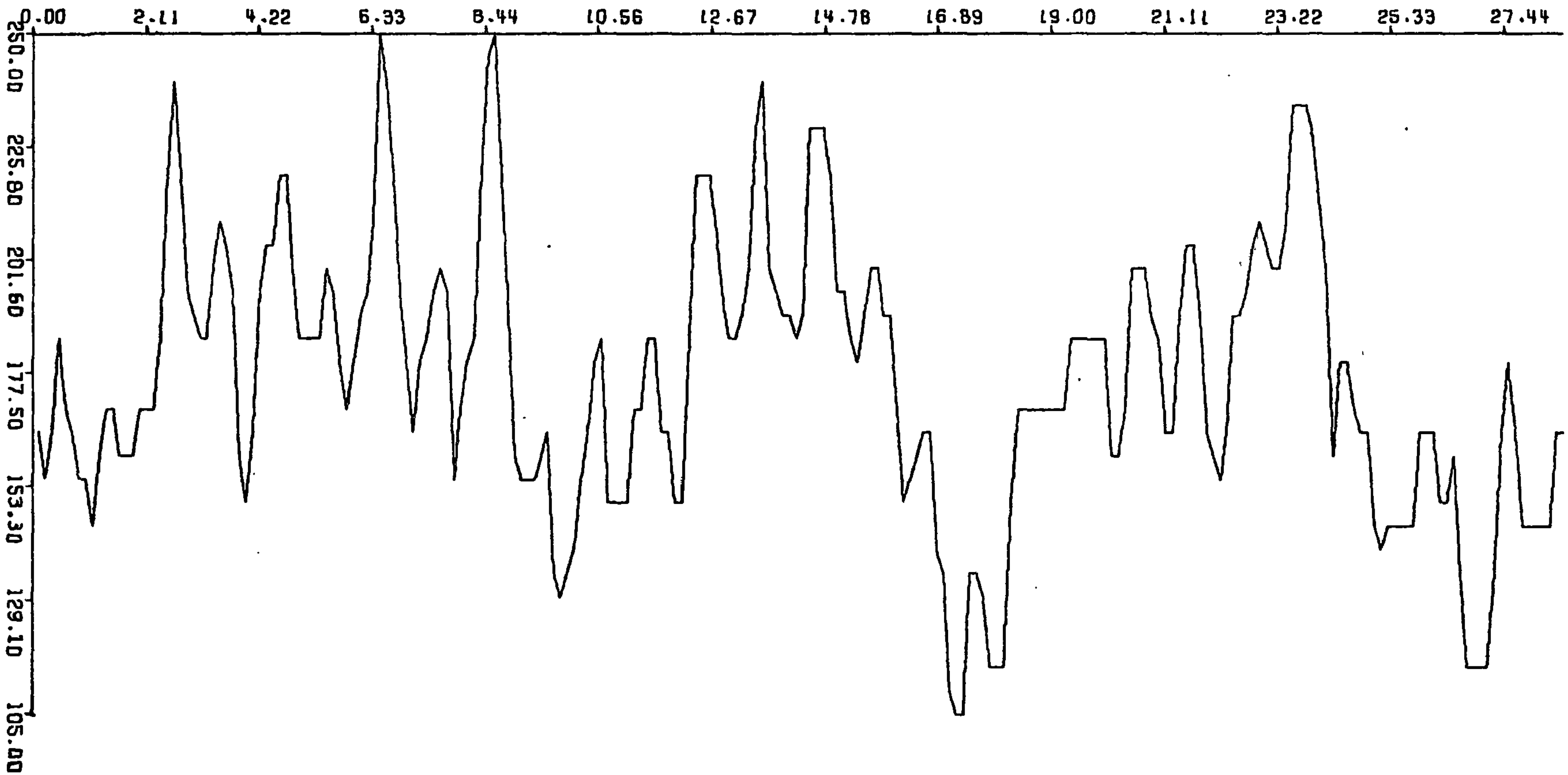
BAROMETRIC PRESSURE S2

(mb)

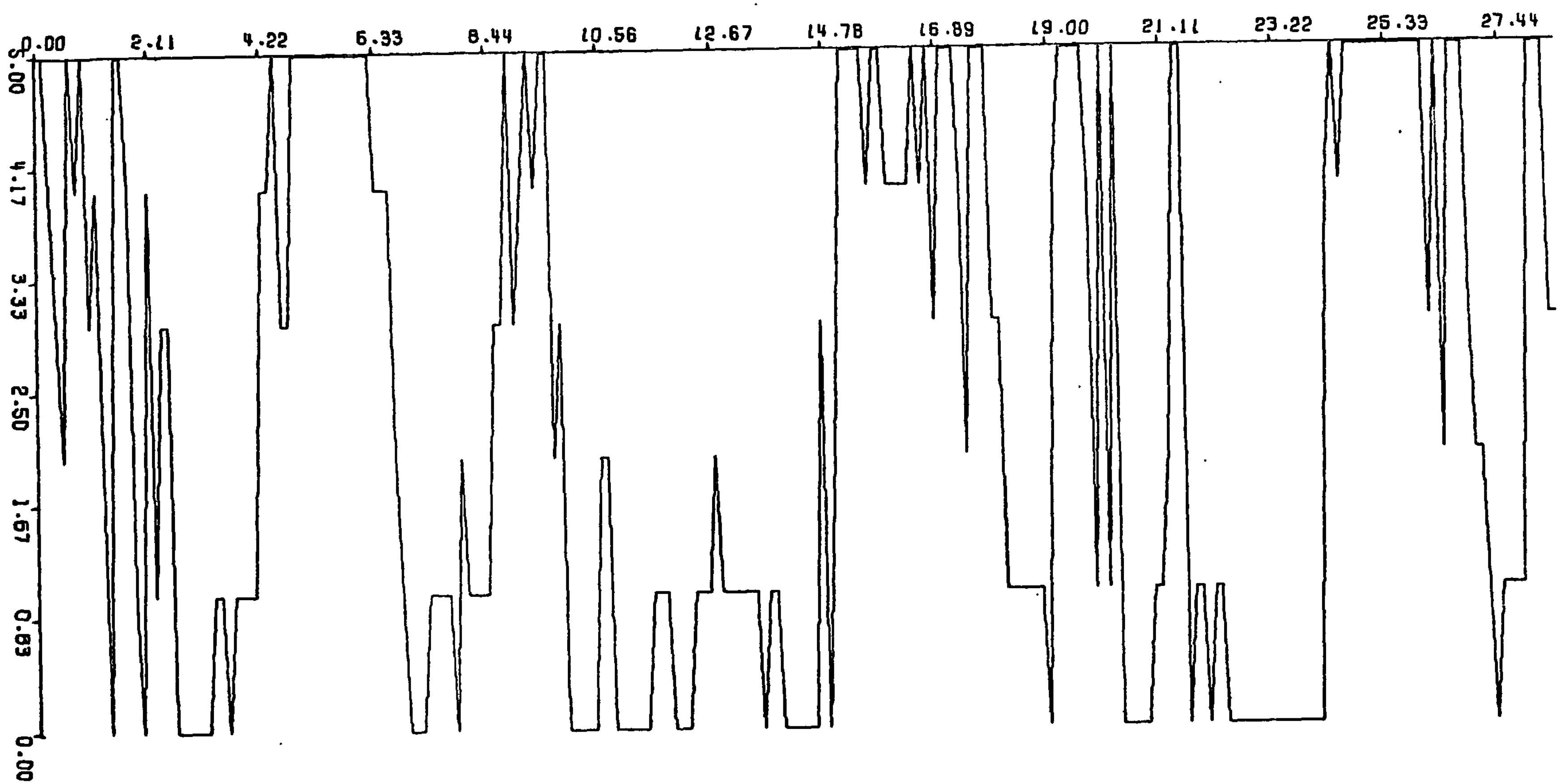


AIR TEMPERATURE S2

(^{o}C x10)

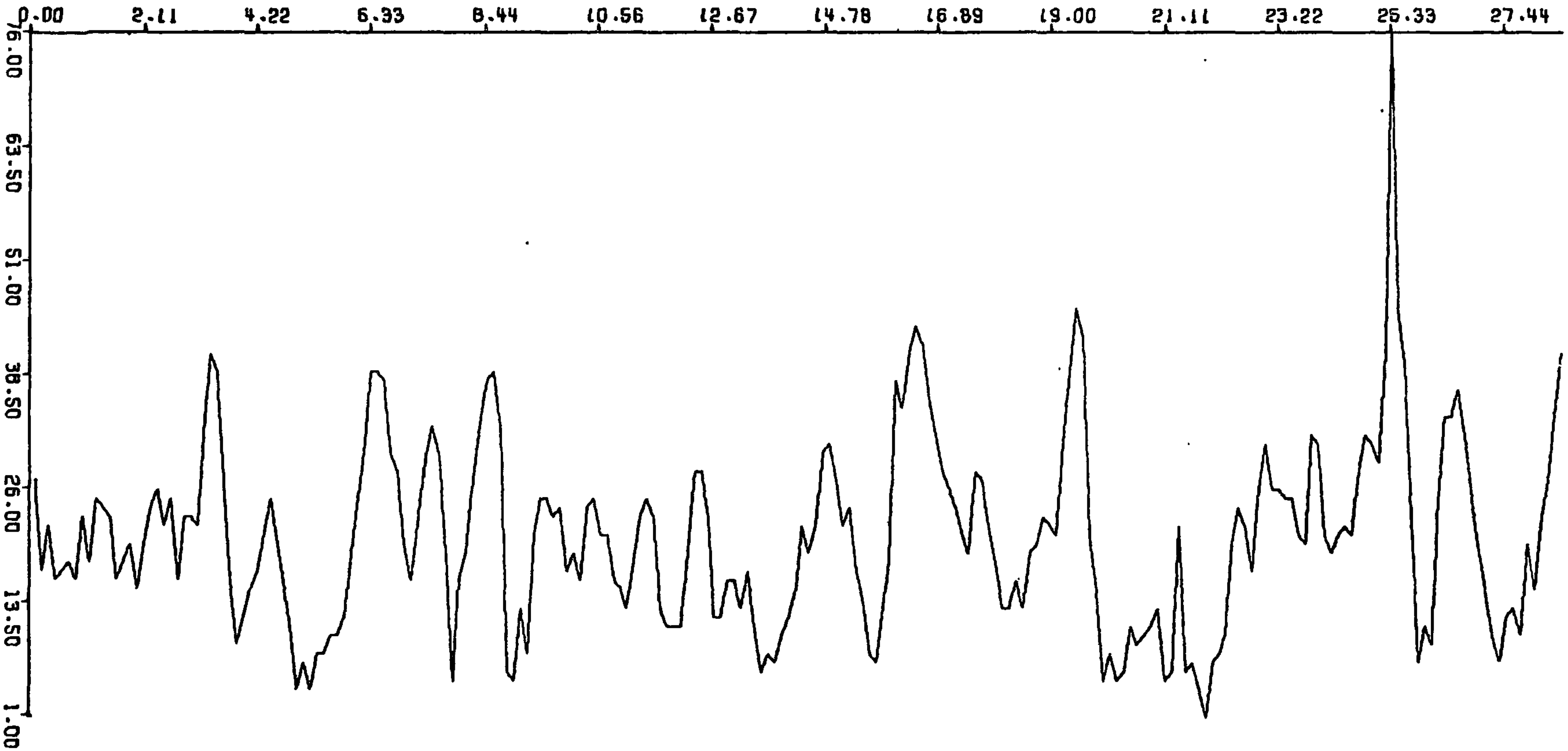


SKY CONDITION S2



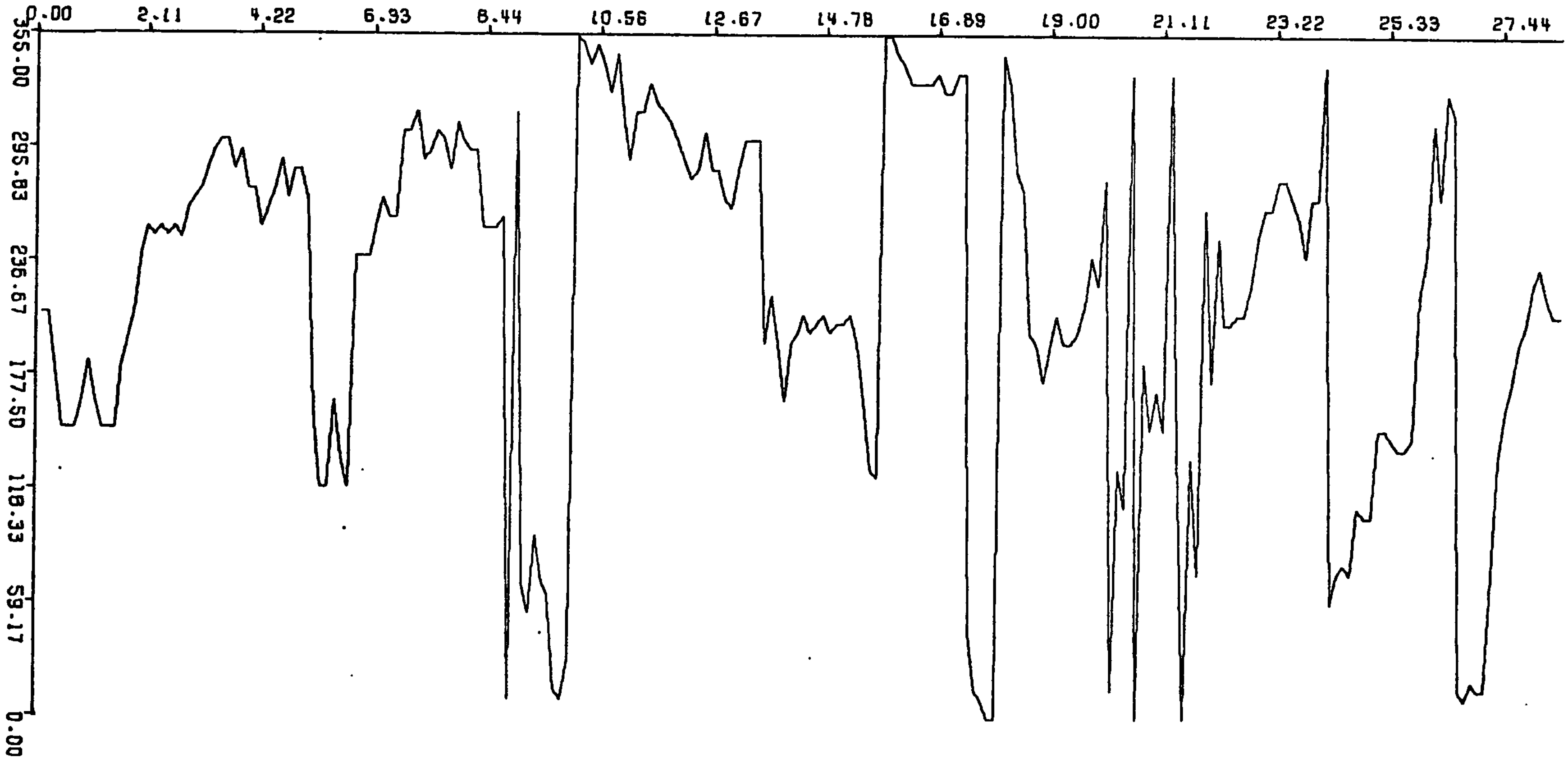
WIND SPEED S2

(km/hr)



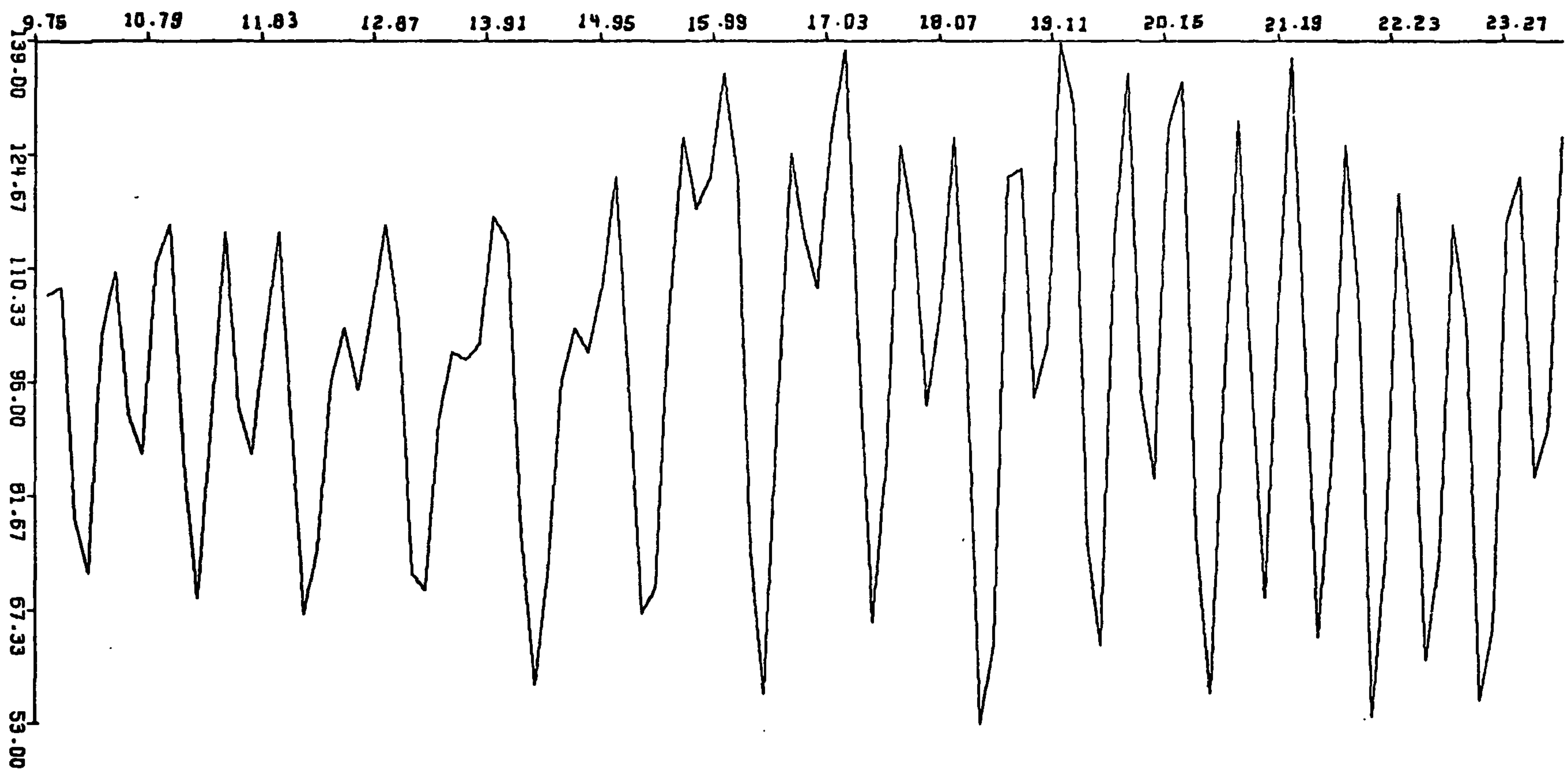
WIND DIRECTION S2

(°)



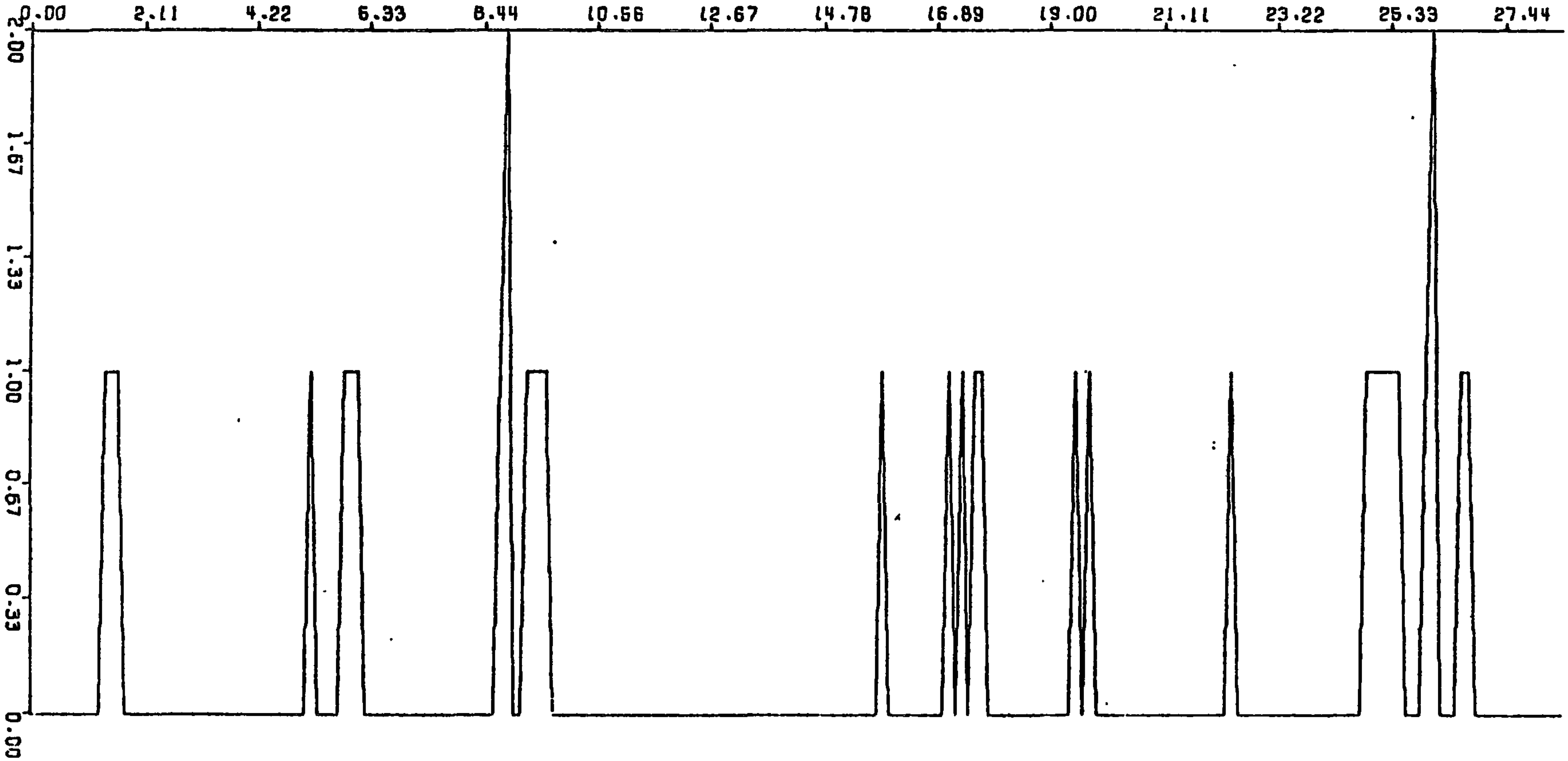
WATER LEVEL S2

(cm)



RAINFALL S2

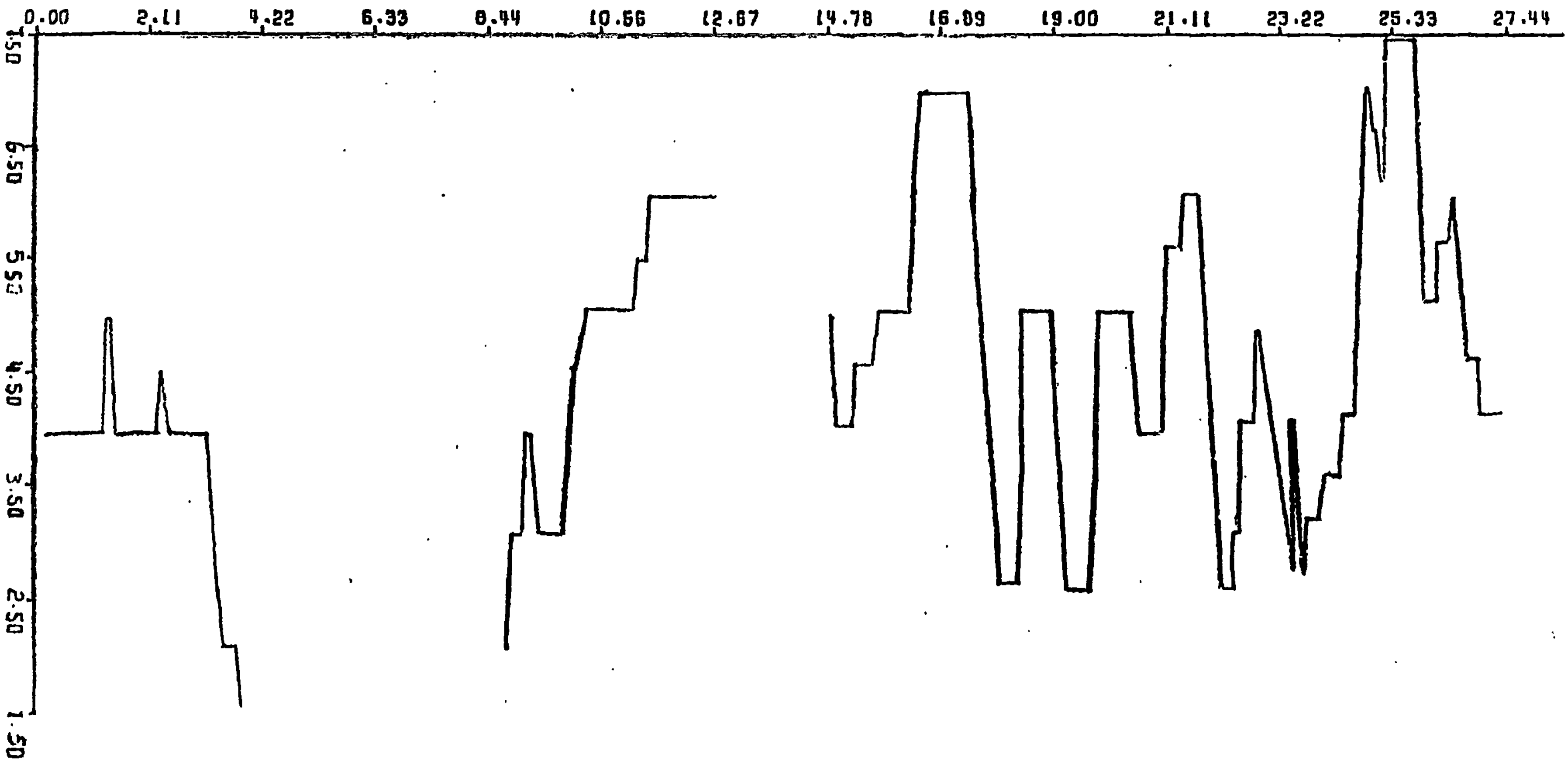
(mm)



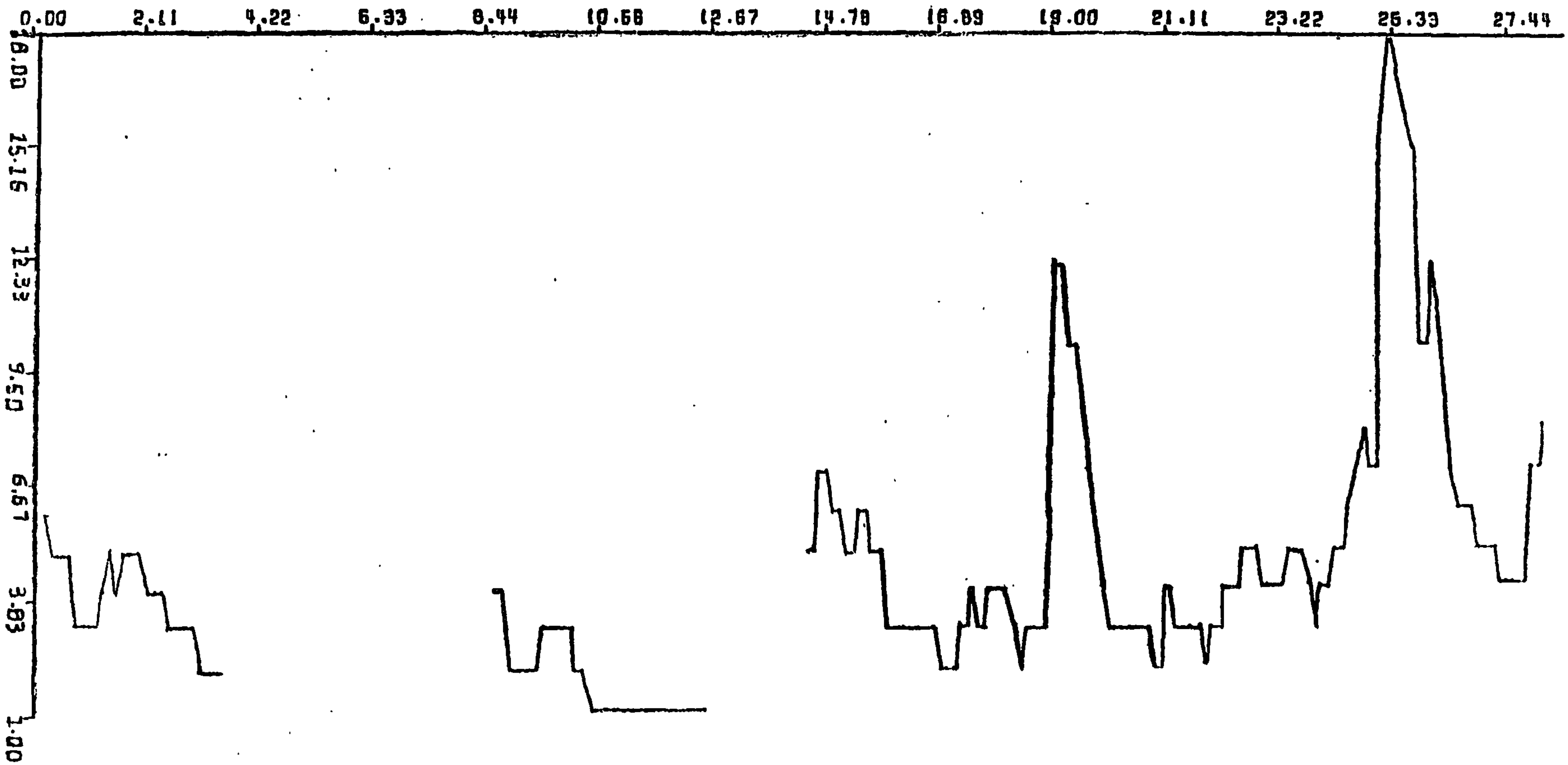
74

OFFSHORE WAVE PERIOD S2

(sec)

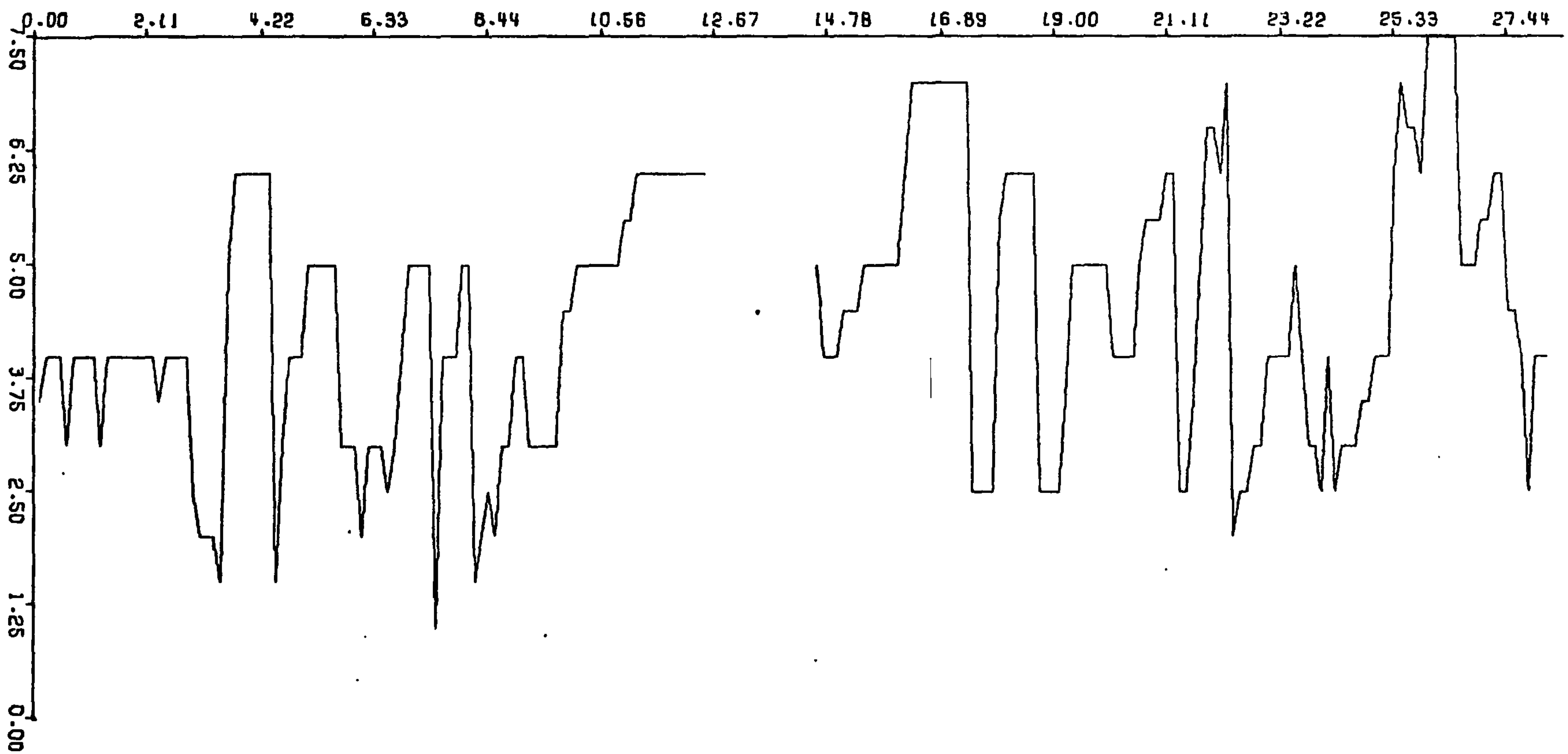


OFFSHORE WAVE HT. S2
(decimeters)



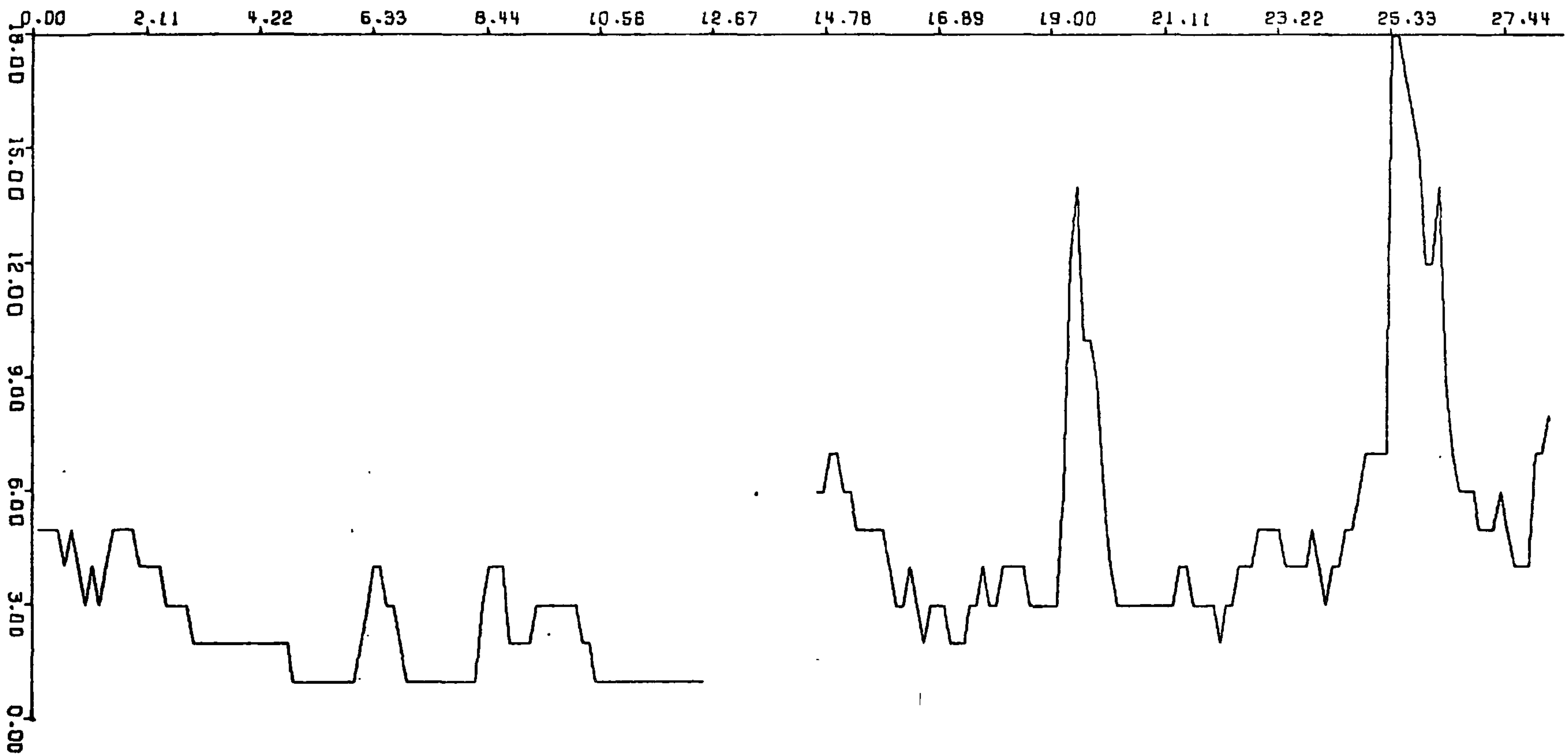
NEARSHORE WAVE PERIOD S2

(sec)



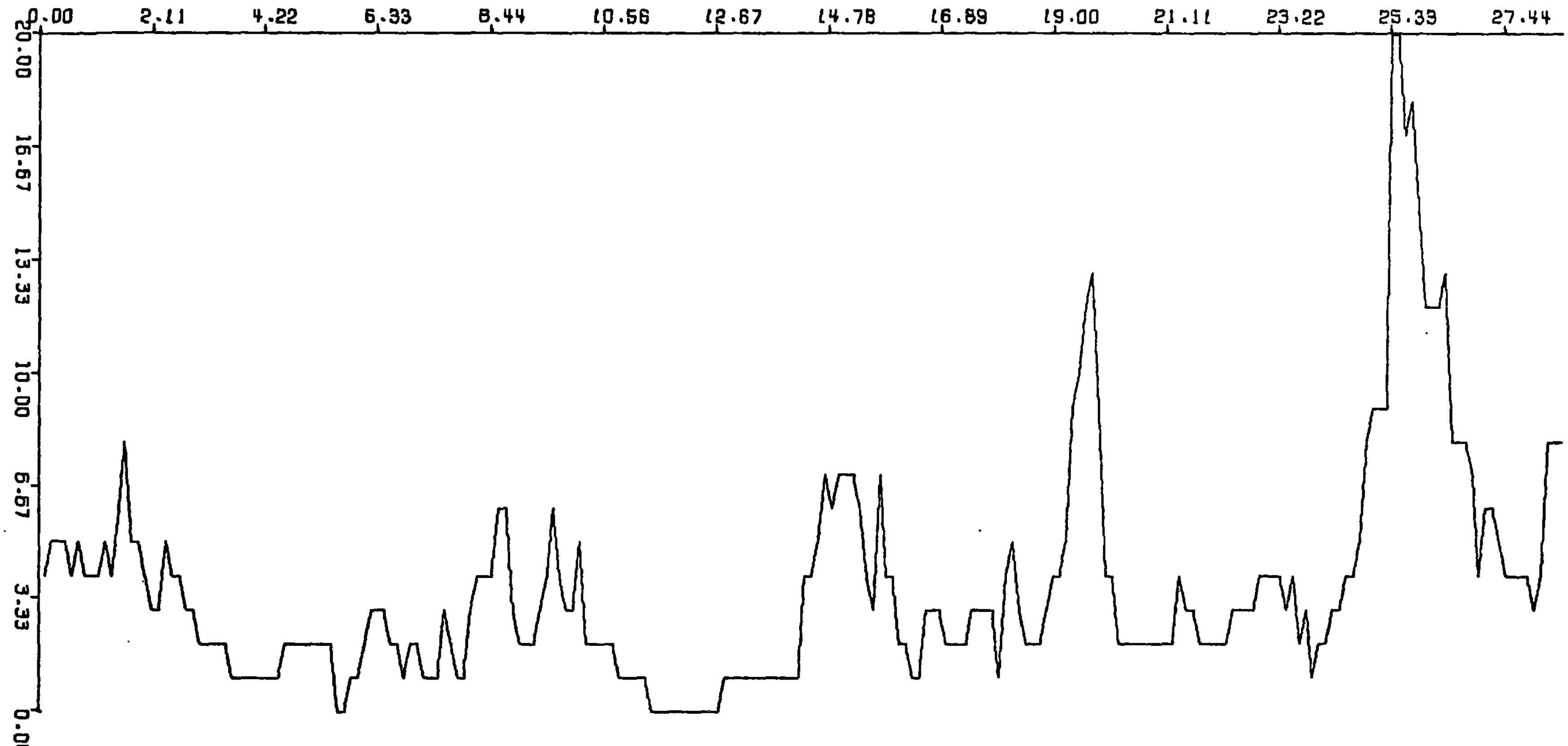
NEARSHORE WAVE HT. S2

(decimeters)

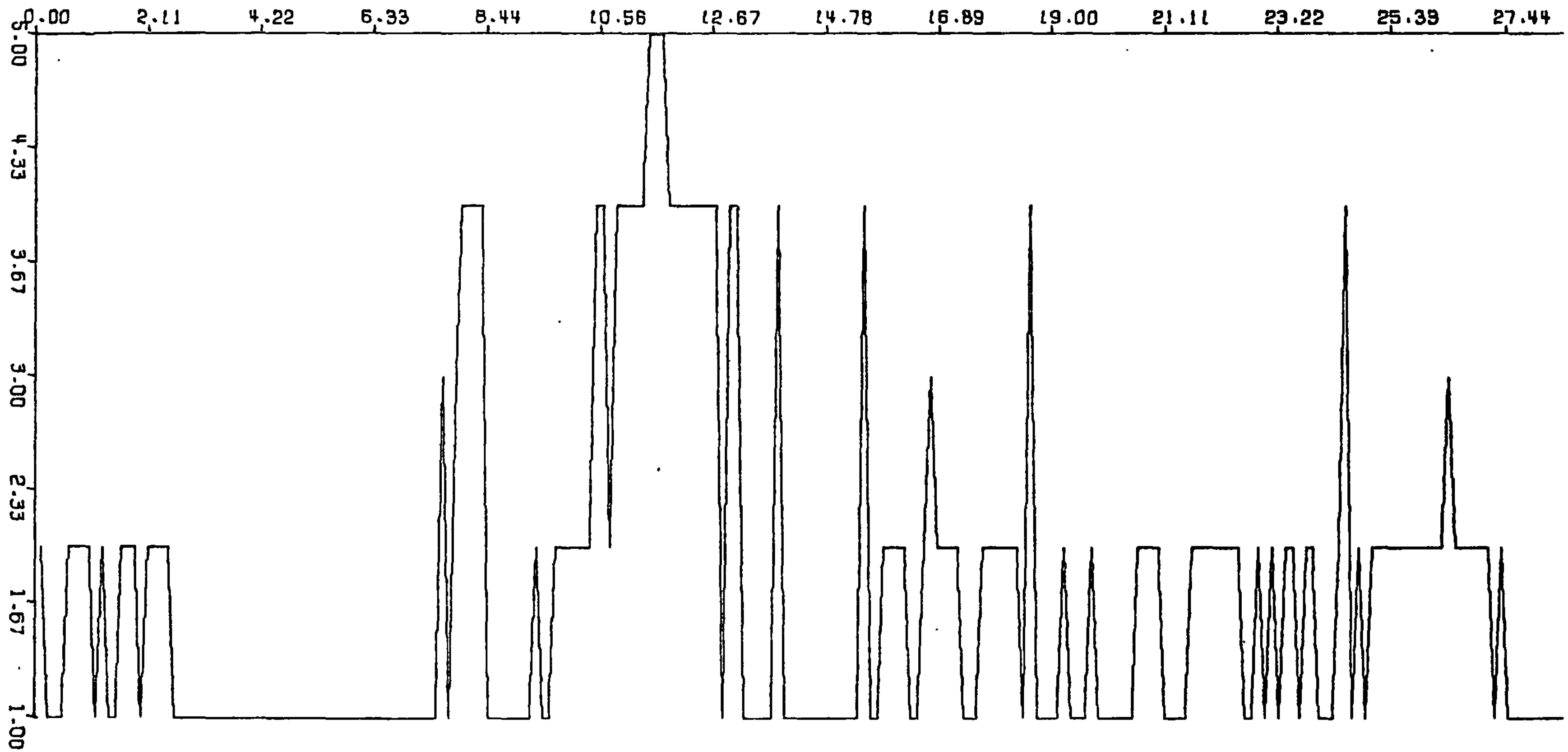


BREAKER HT. S2

(decimeters)

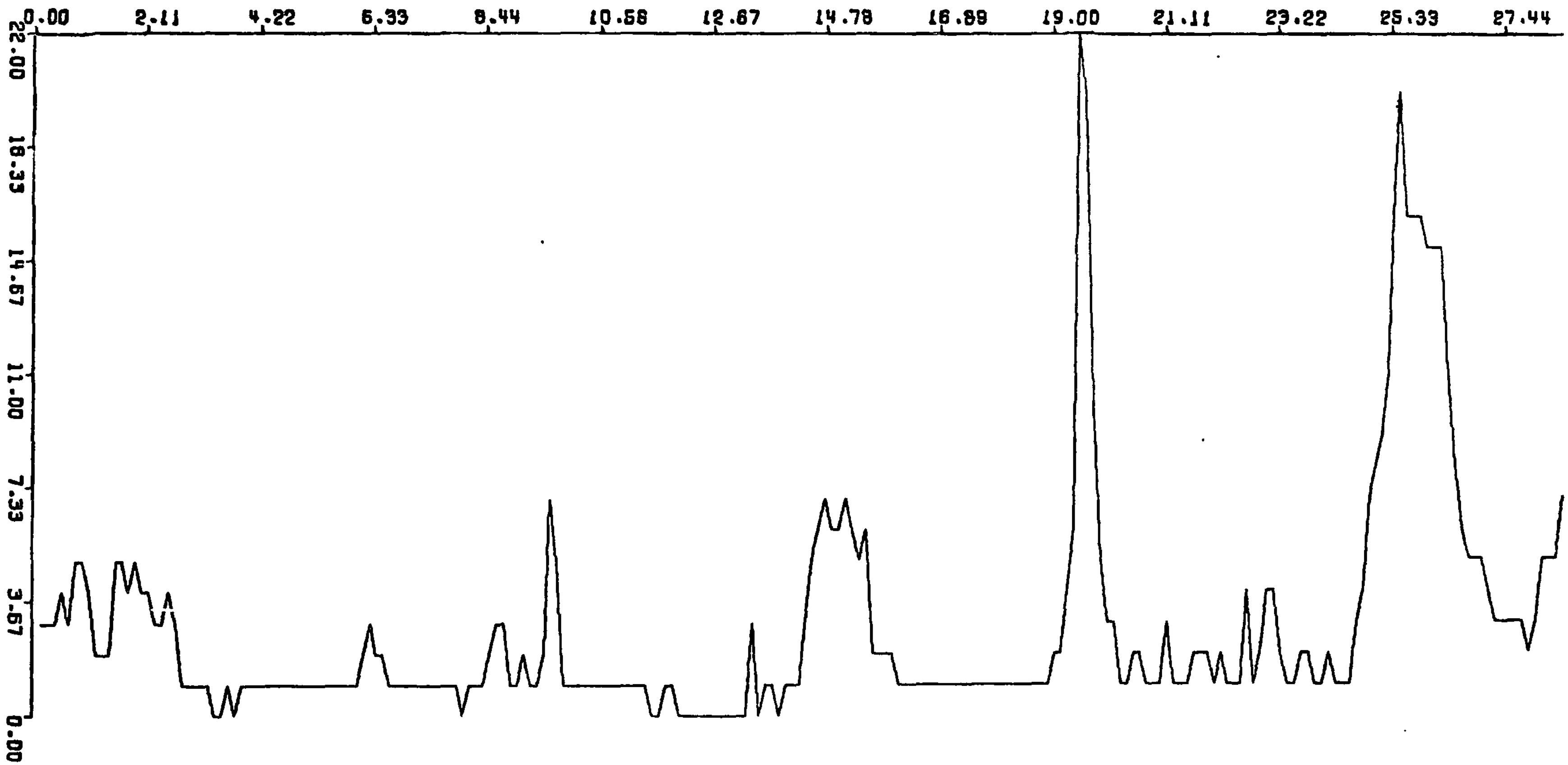


BREAKER TYPE S2



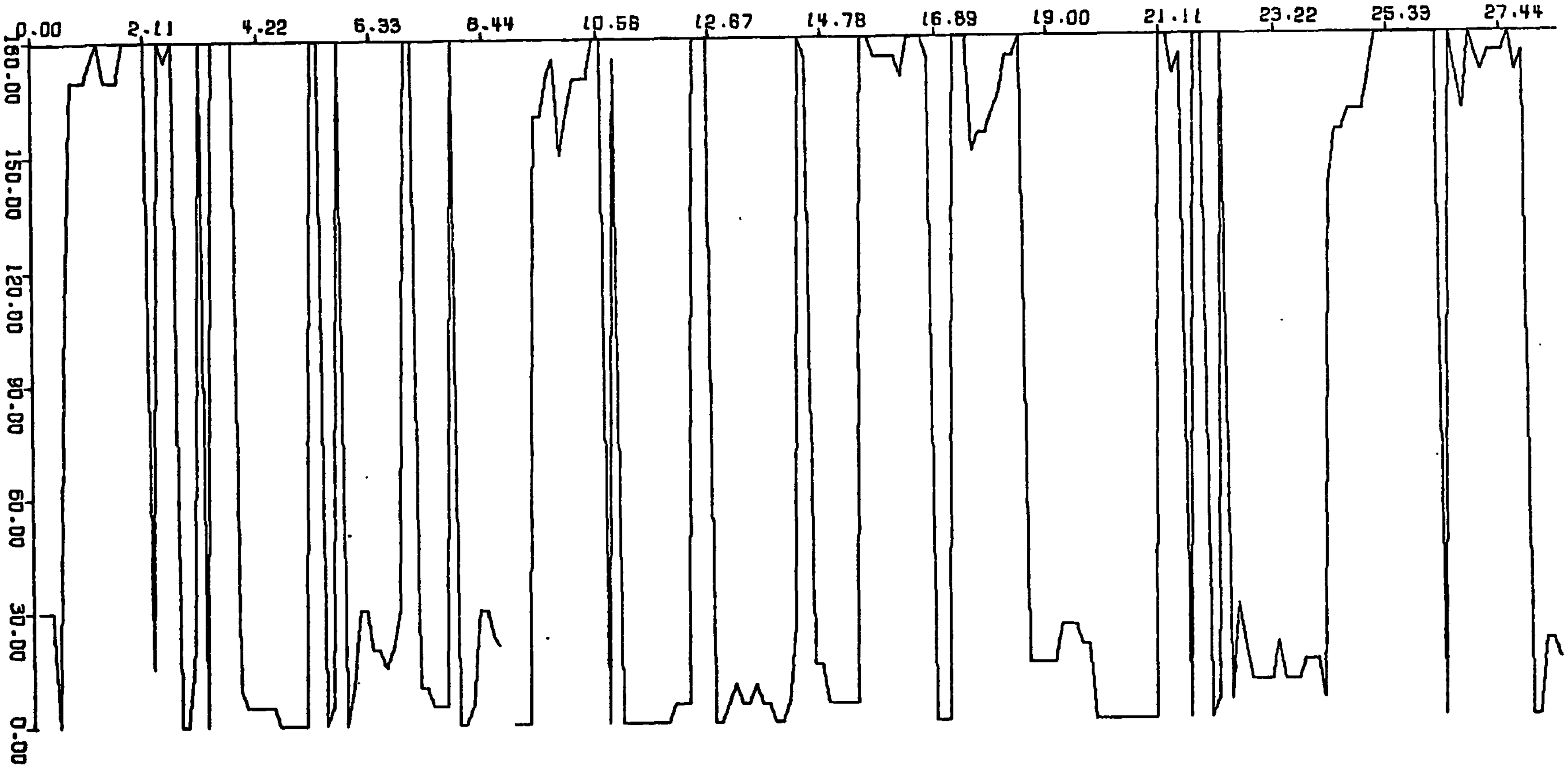
BREAKER DISTANCE S2

(decameters)



BREAKER ANGLE S2

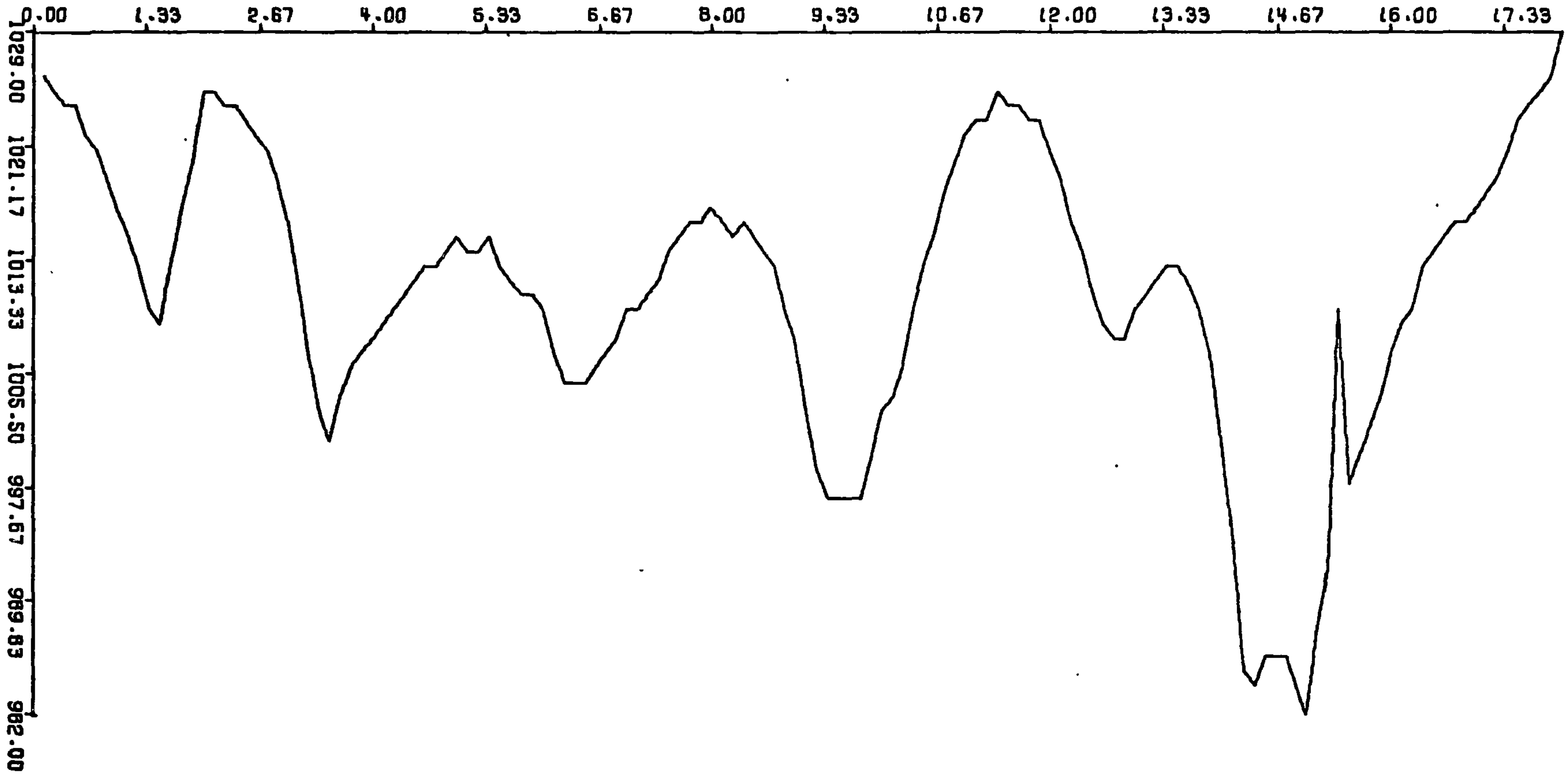
(°)



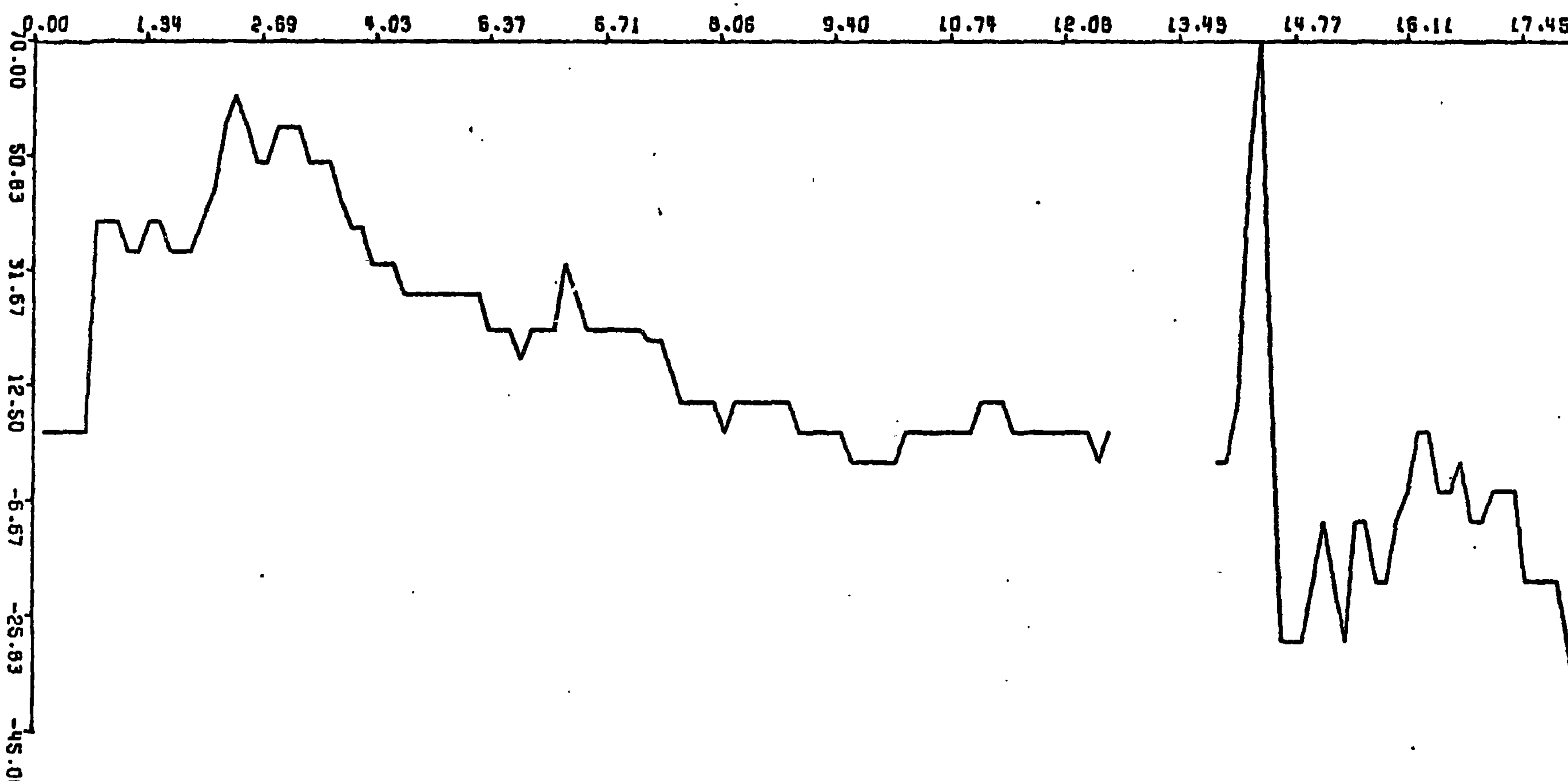
DATA PLOTS

Winter west

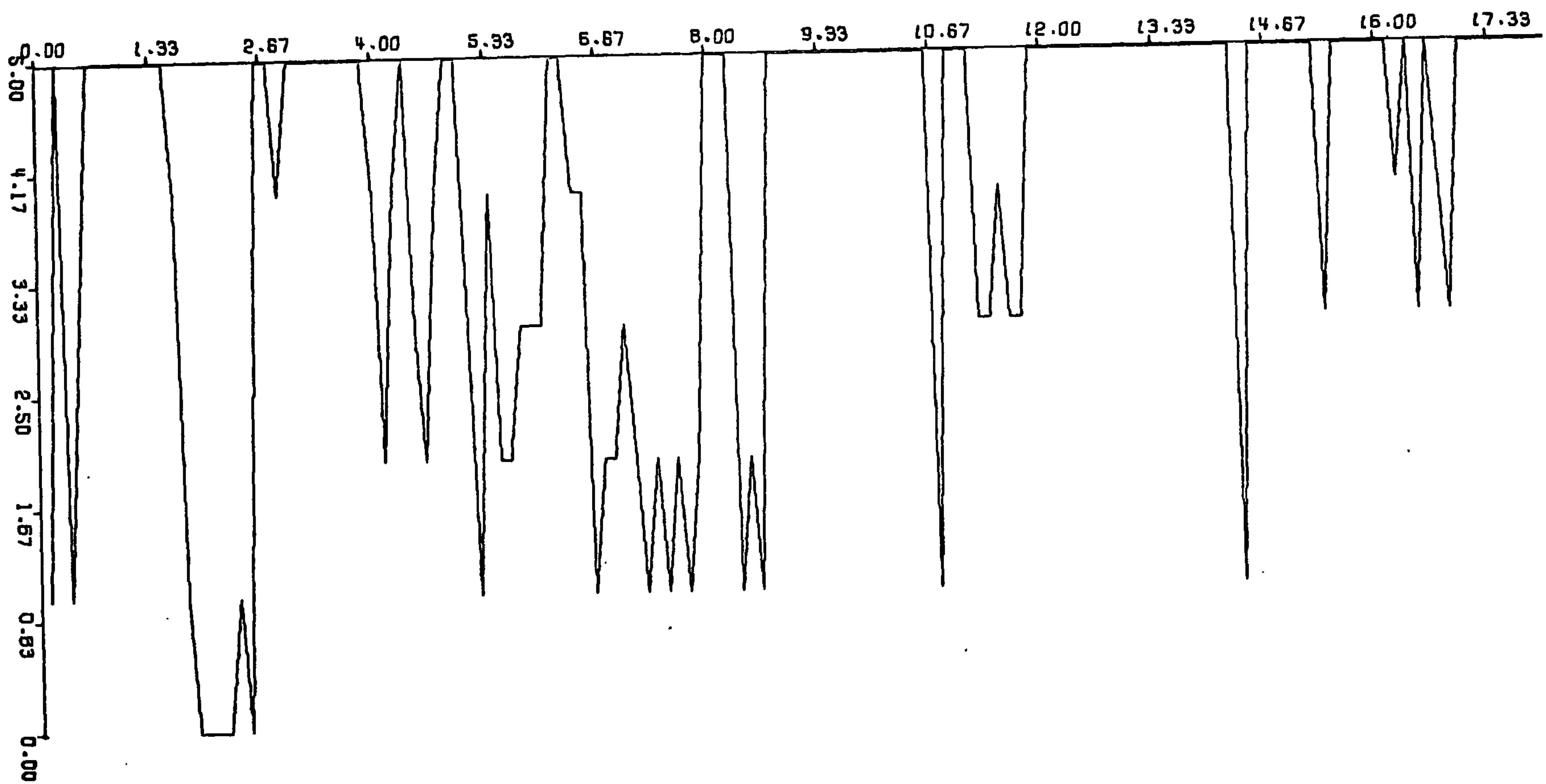
BAROMETRIC PRESSURE W1
(mb)



AIR TEMPERATURE W1
(°C x10)

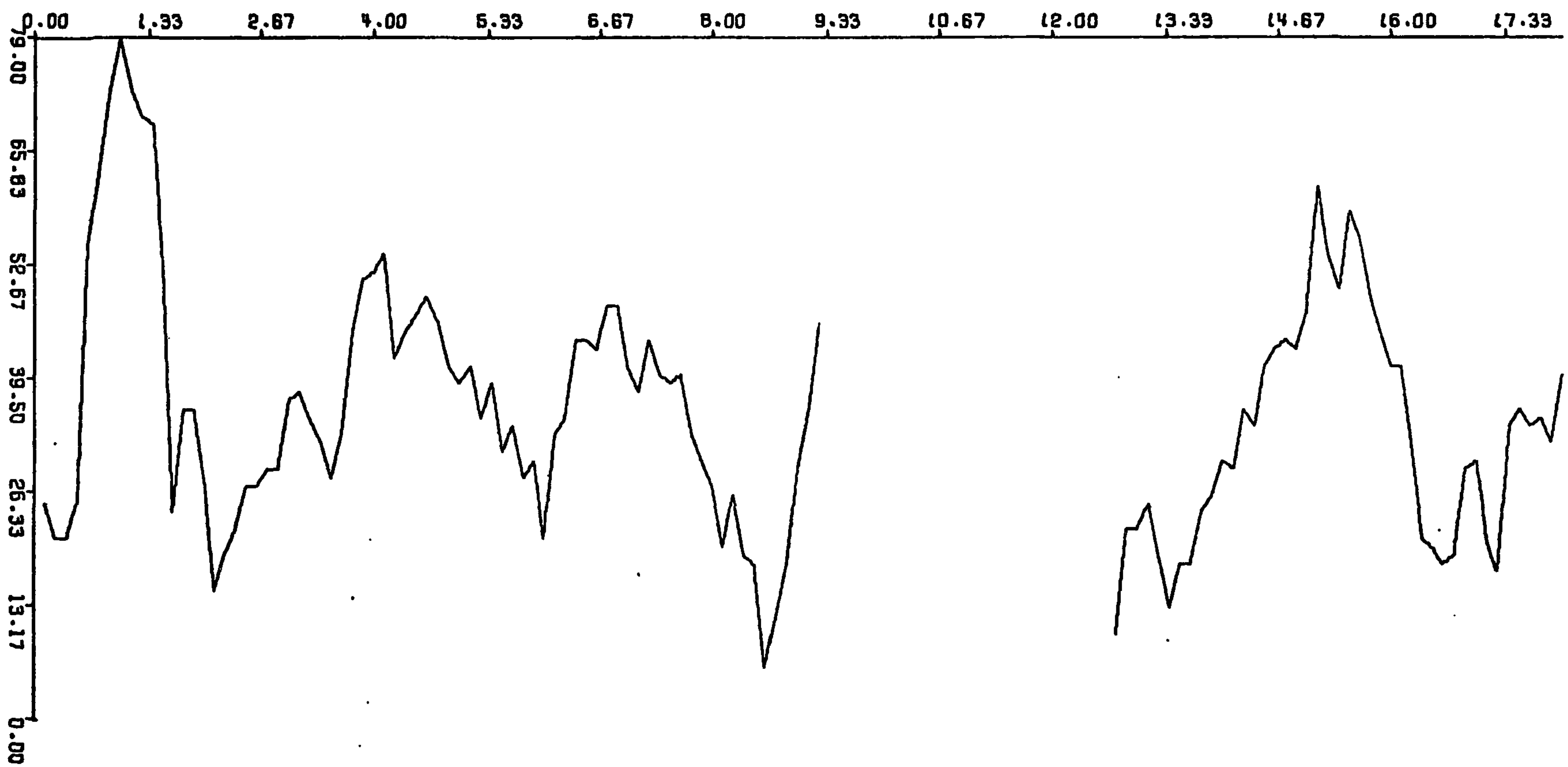


SKY CONDITIONS W1



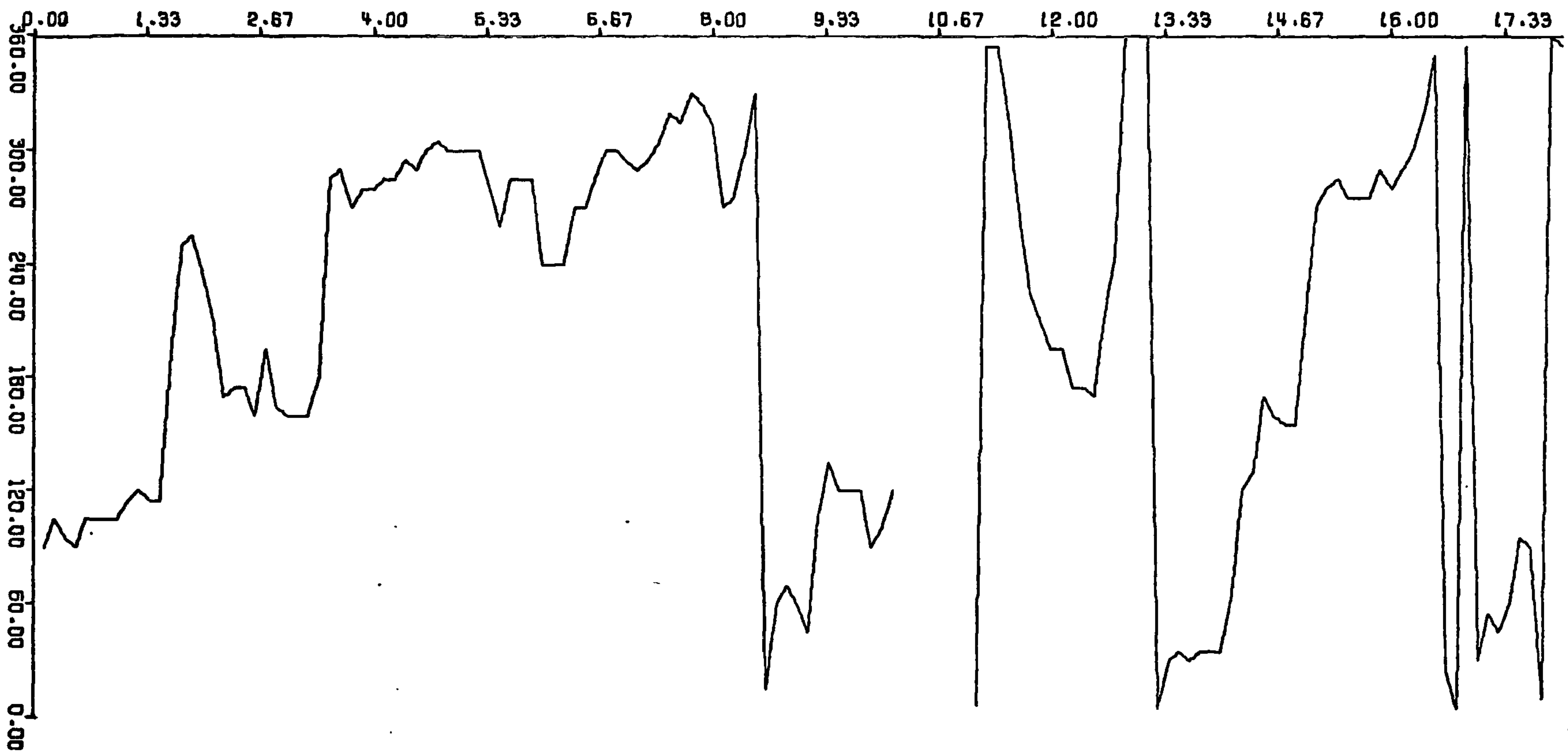
WIND SPEED W1

(km/hr)



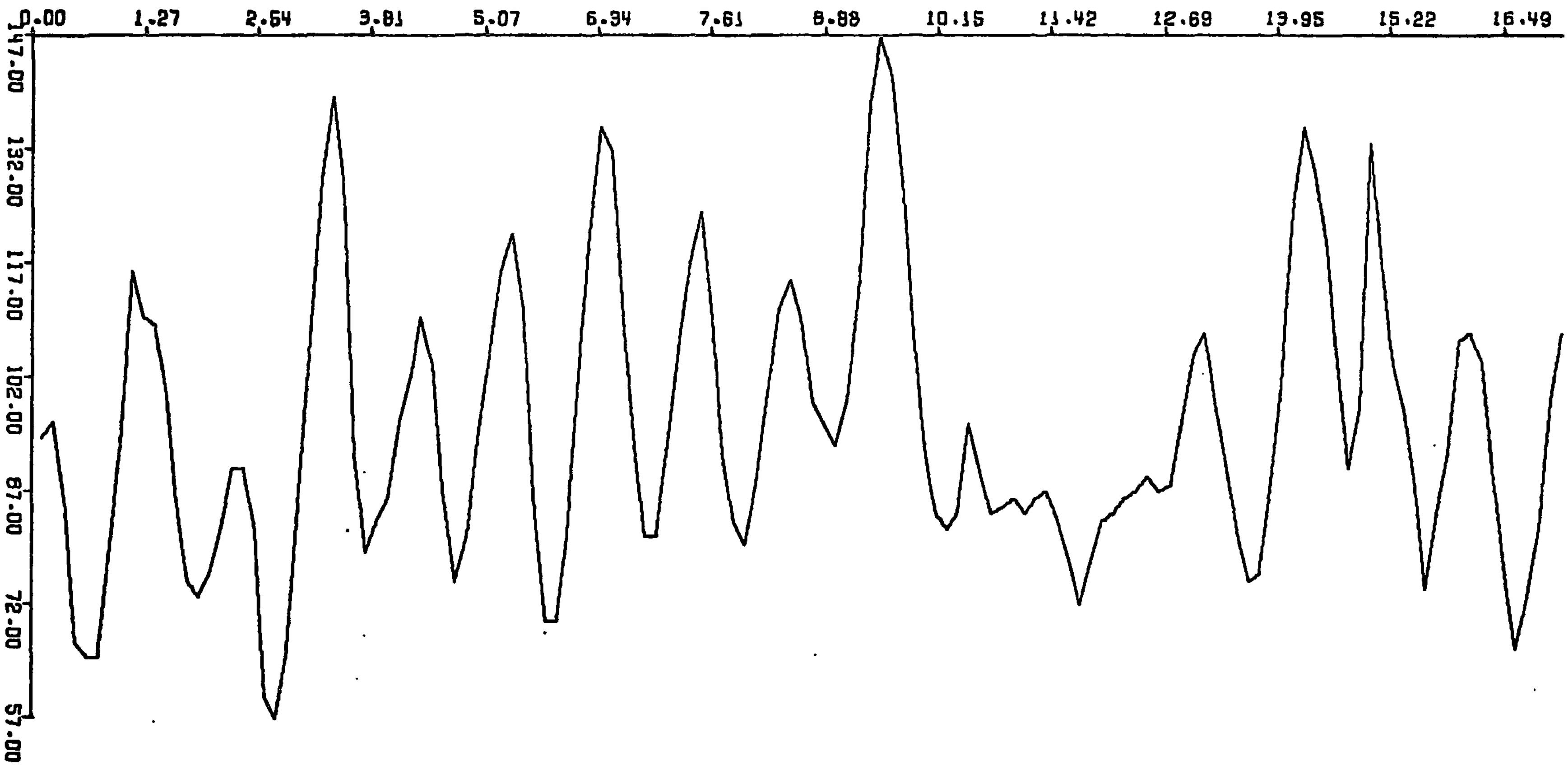
WIND DIRECTION W1

(°)



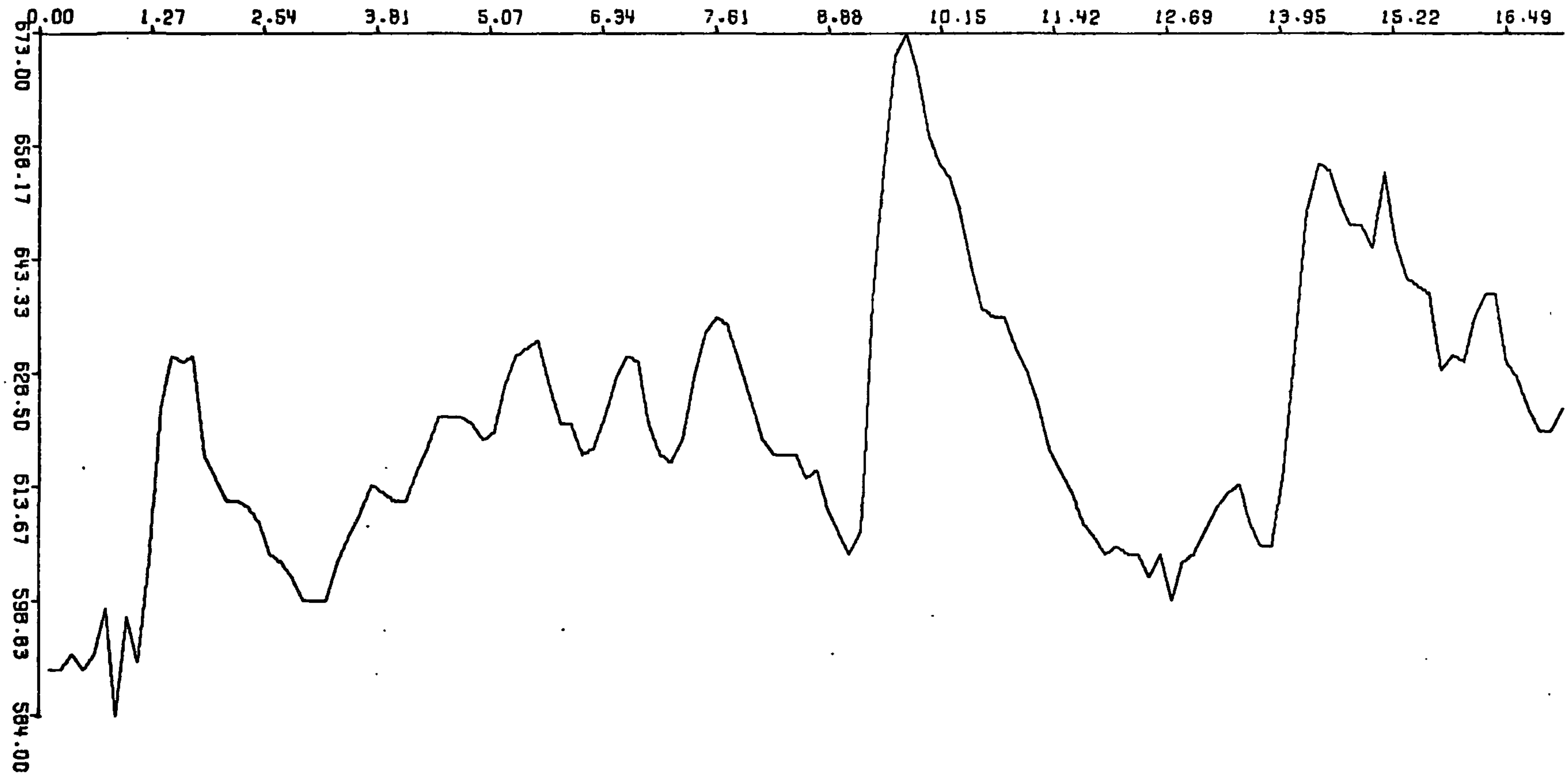
WATER LEVEL W1

(cm)



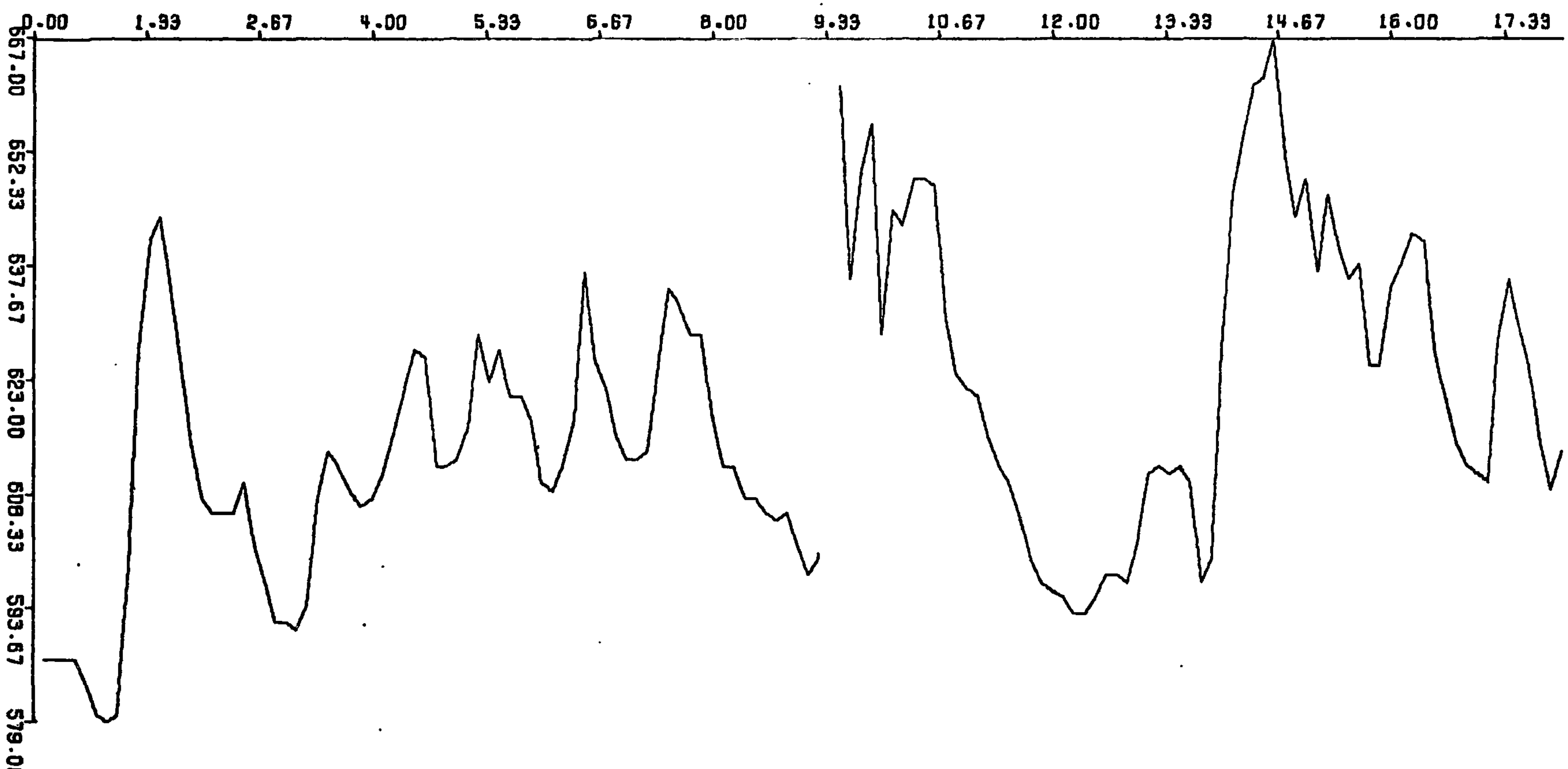
GROUNDWATER LEV 1 W1

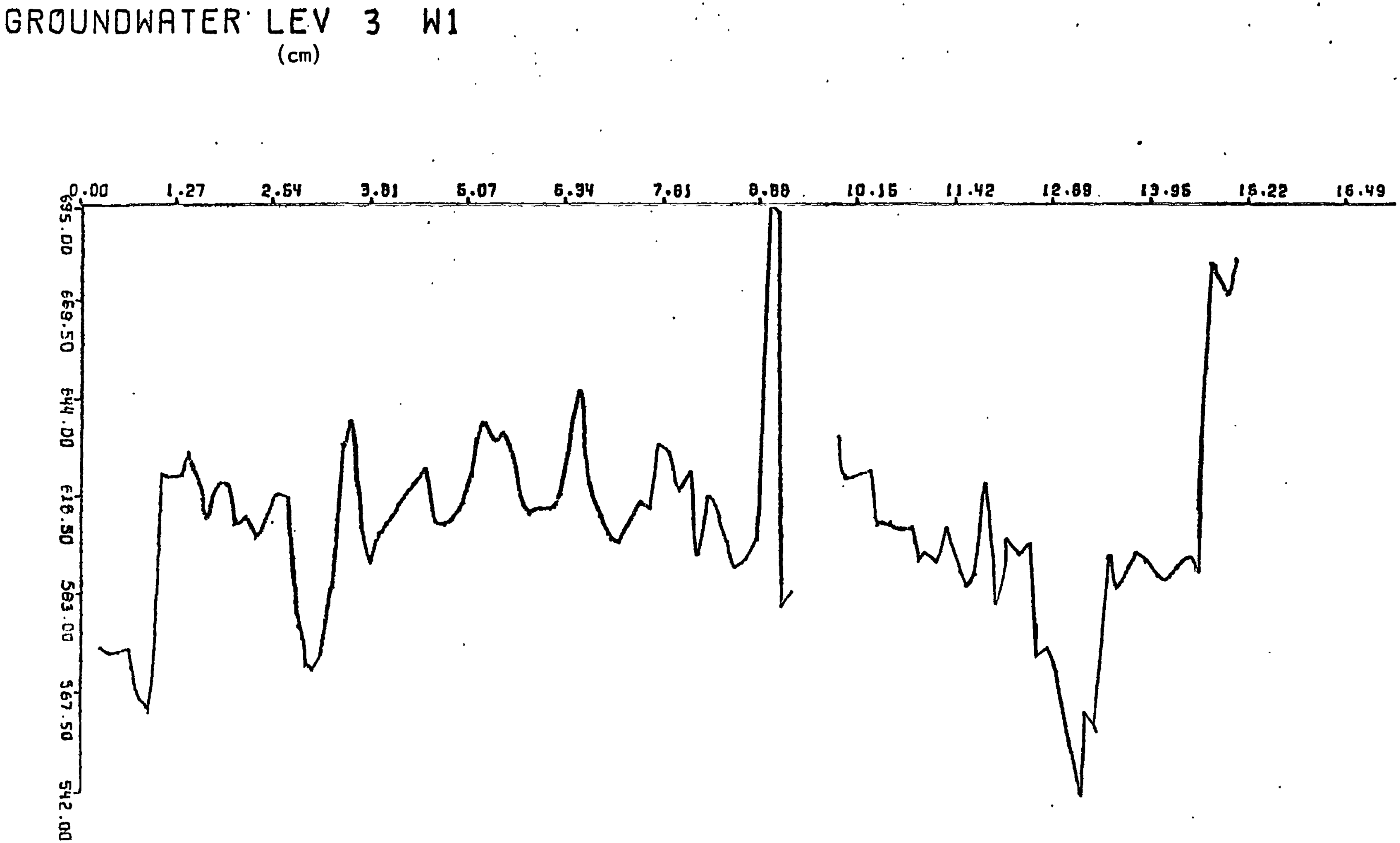
(cm)



GROUNDWATER LEV2 W1

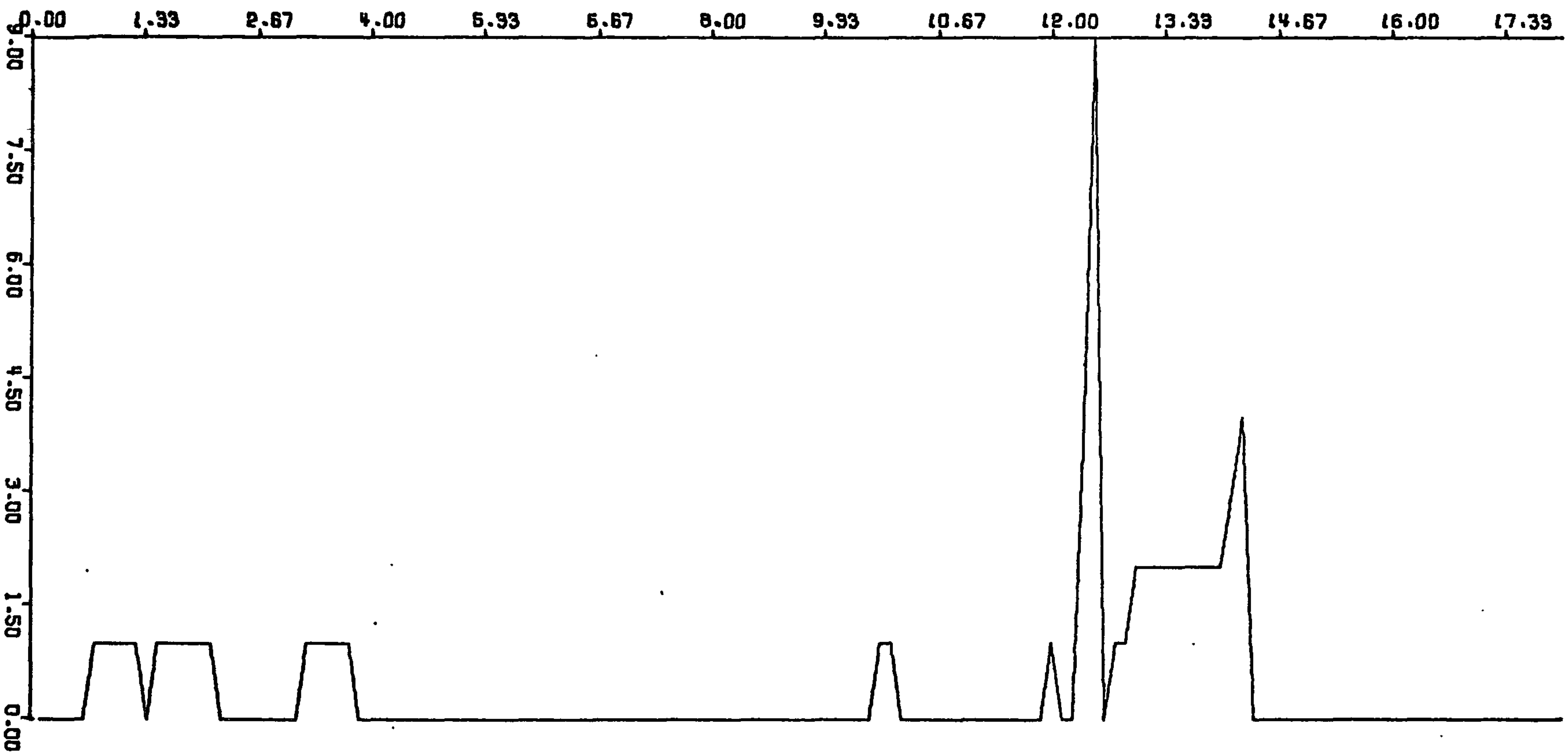
(cm)




GROUNDWATER LEV 3 W1
(cm)
0.00
1.27
2.54
3.81
5.07
6.34
7.61
8.88
10.15
11.42
12.68
13.95
15.22
16.49
695.00
669.50
644.00
618.50
593.00
567.50
542.00

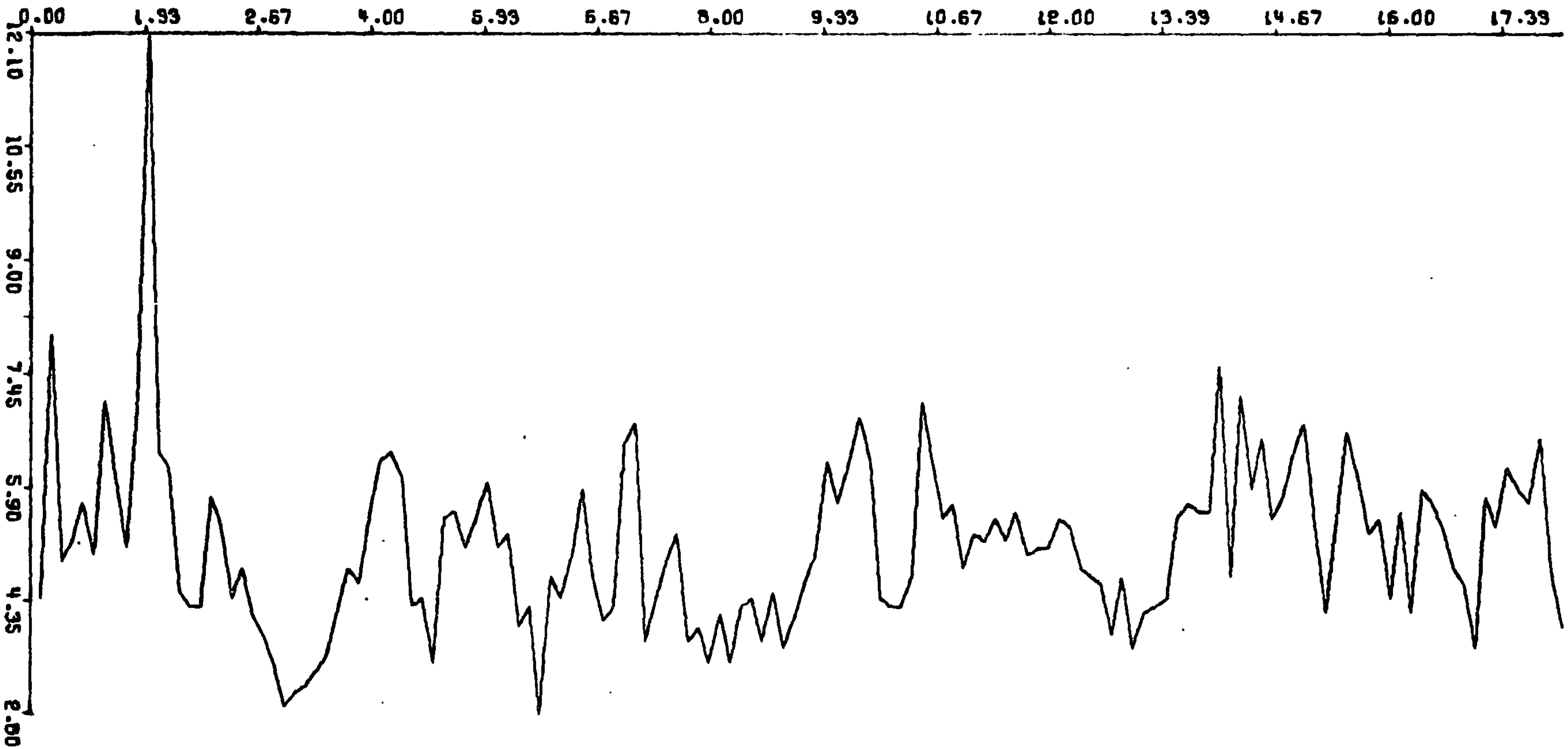
RAINFALL W1

(mm)

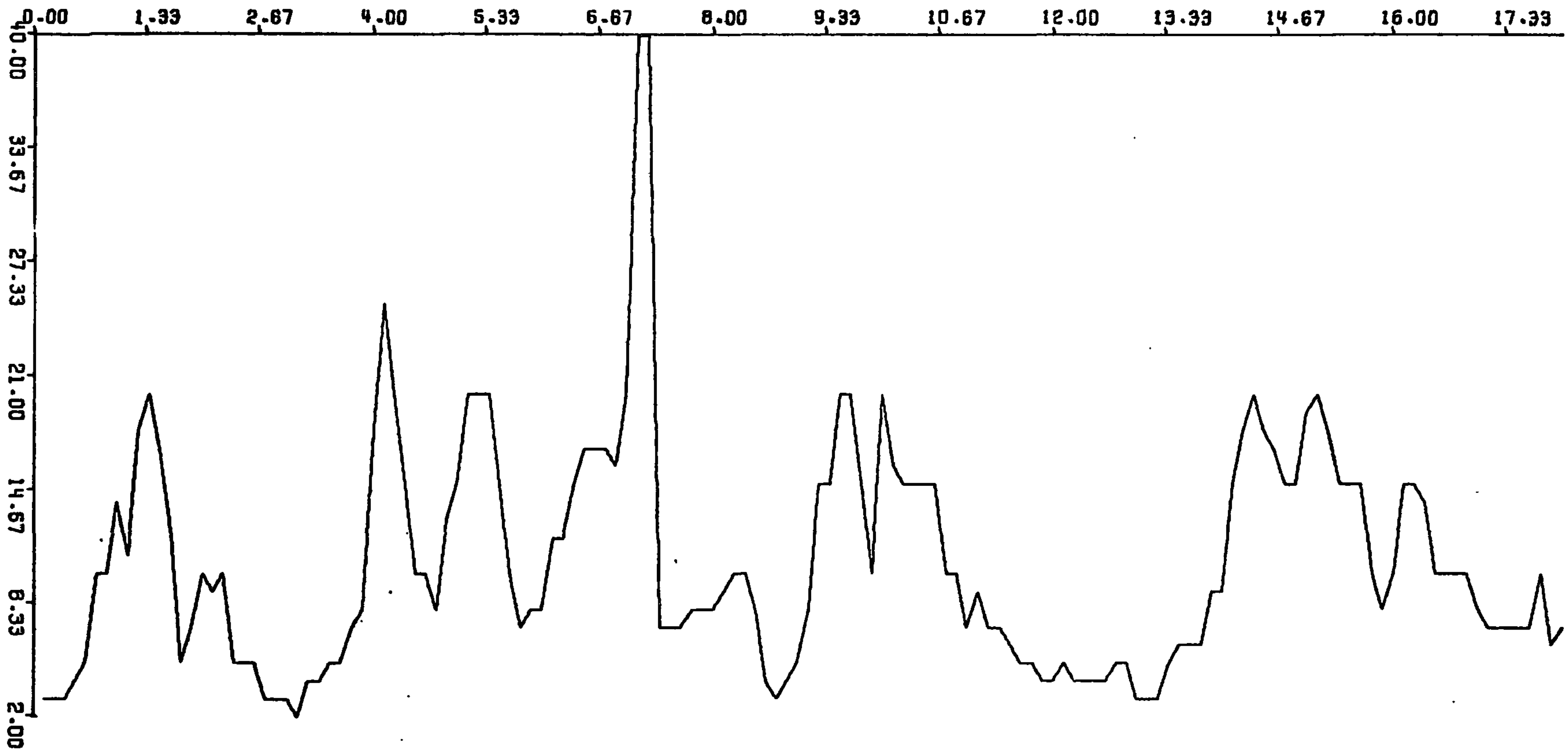


NEARSHORE WAVE PERIOD W1

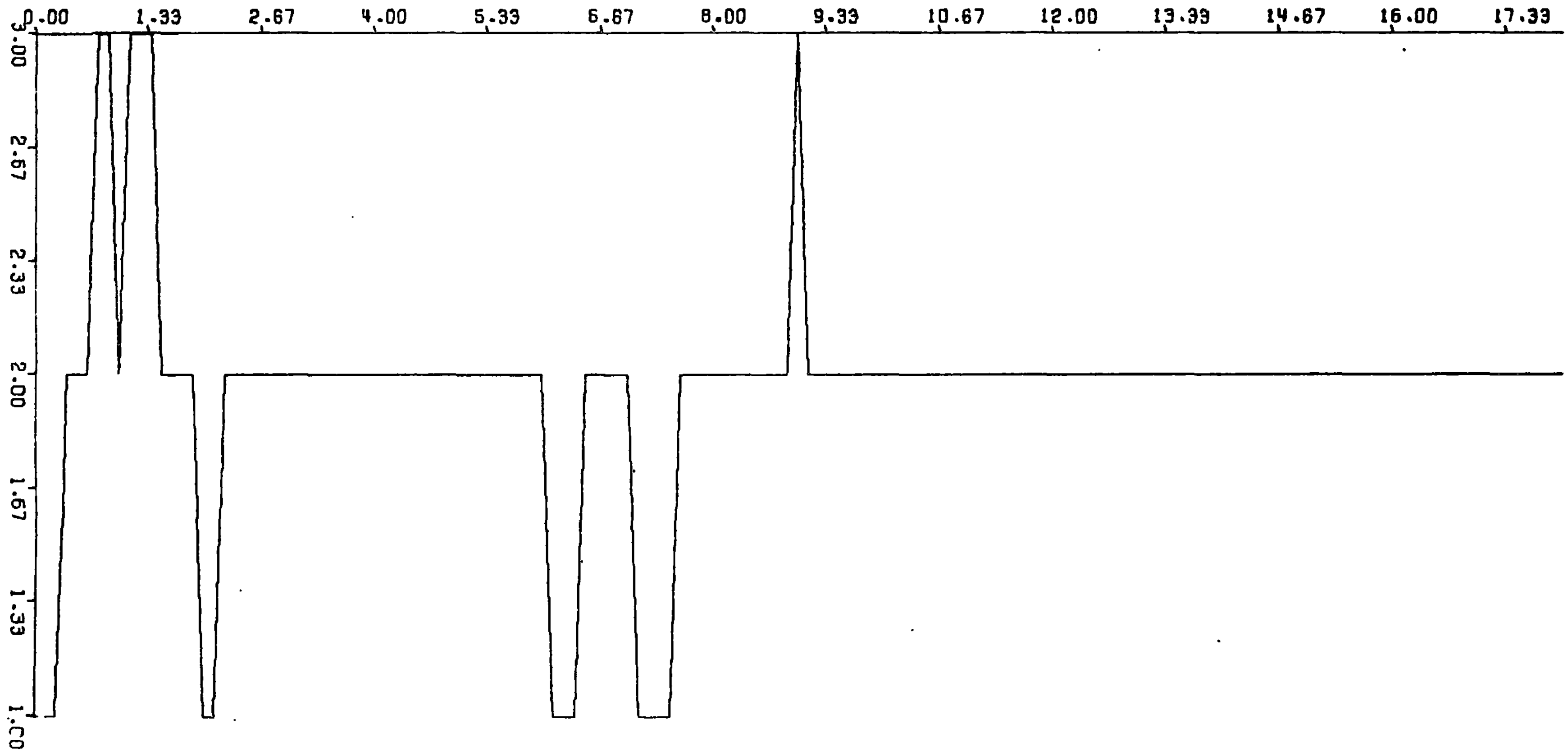
(sec)



BREAKER HT W1
(decimeters)

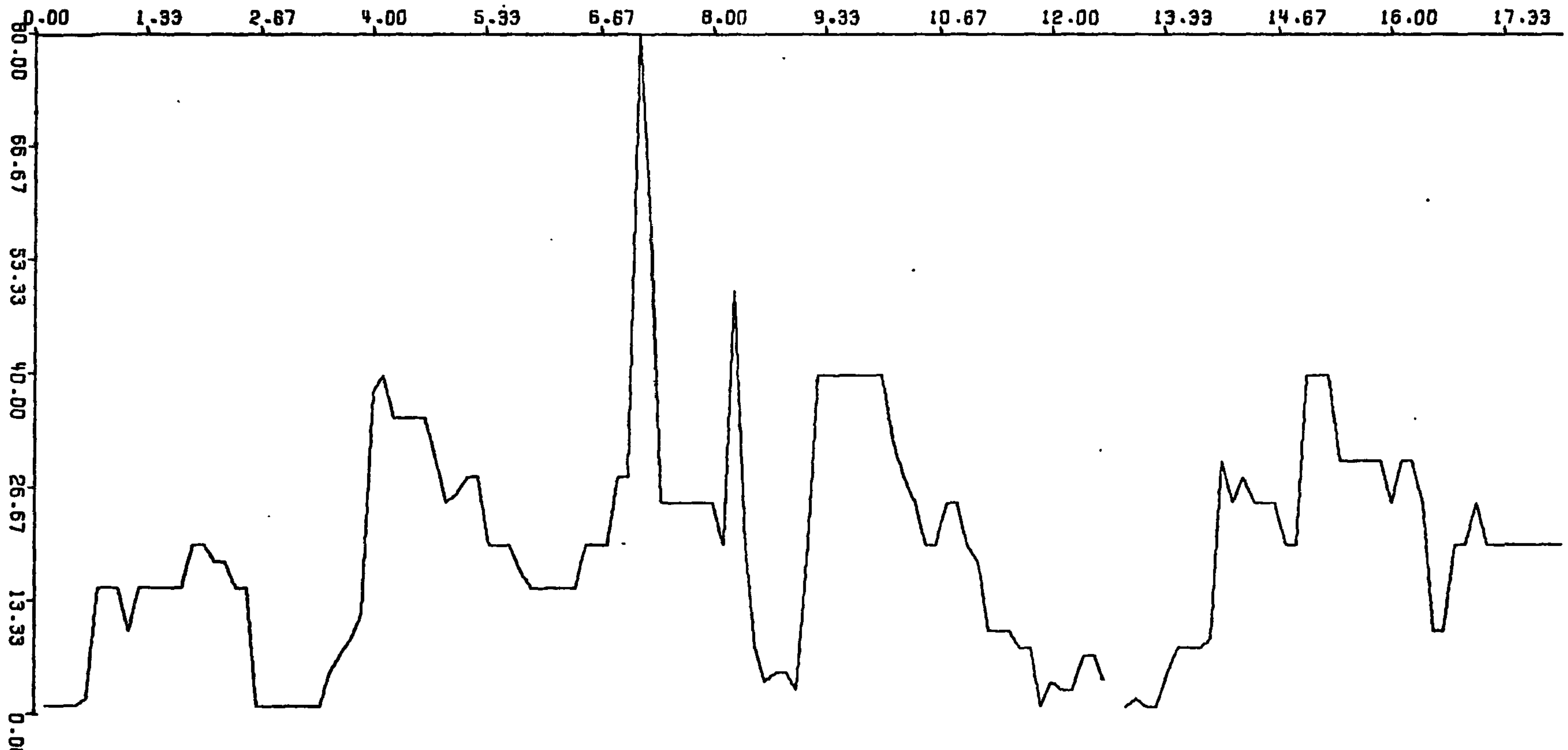


BREAKER TYPE W1

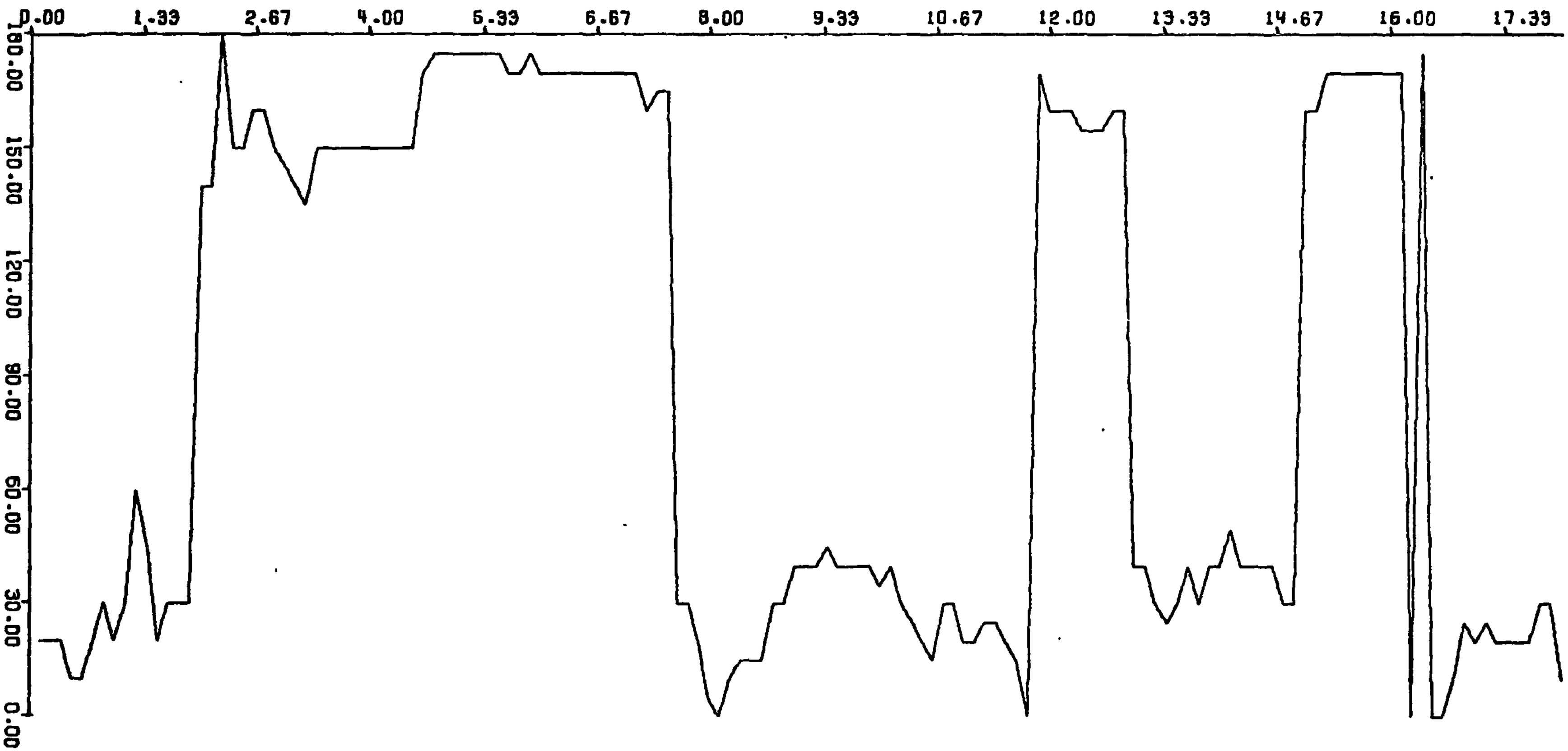


BREAKER DISTANCE W1

(decameters)



BREAKER ANGLE W1
(°)



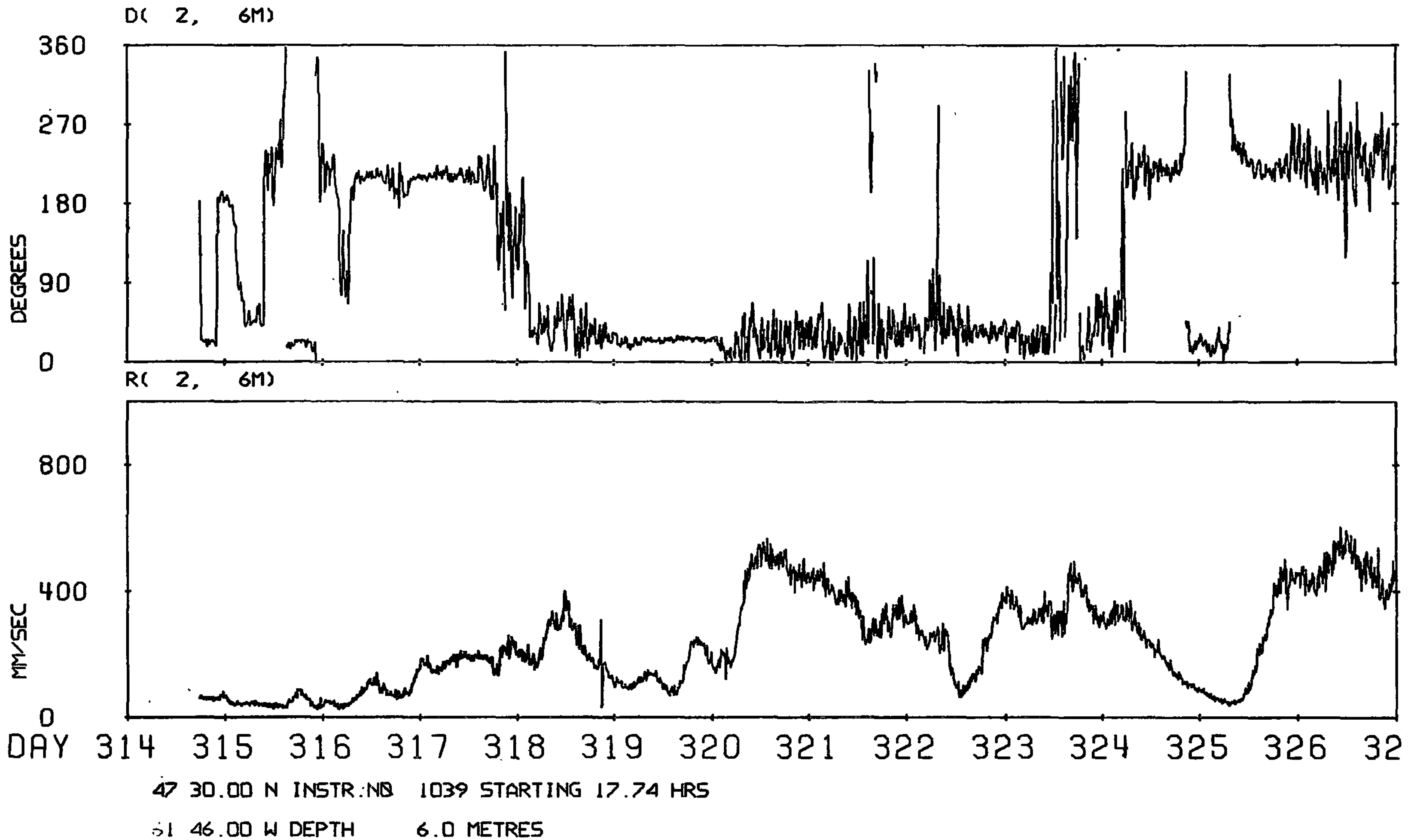


Figure 2.5 Plot of direction and velocity data from the Aanderaa current meter at the #1 wave tower site in the winter phase. Dates are given as Julian Days (314 = November 10; 327 = November 23; 340 = December 6; and 353 = December 19).

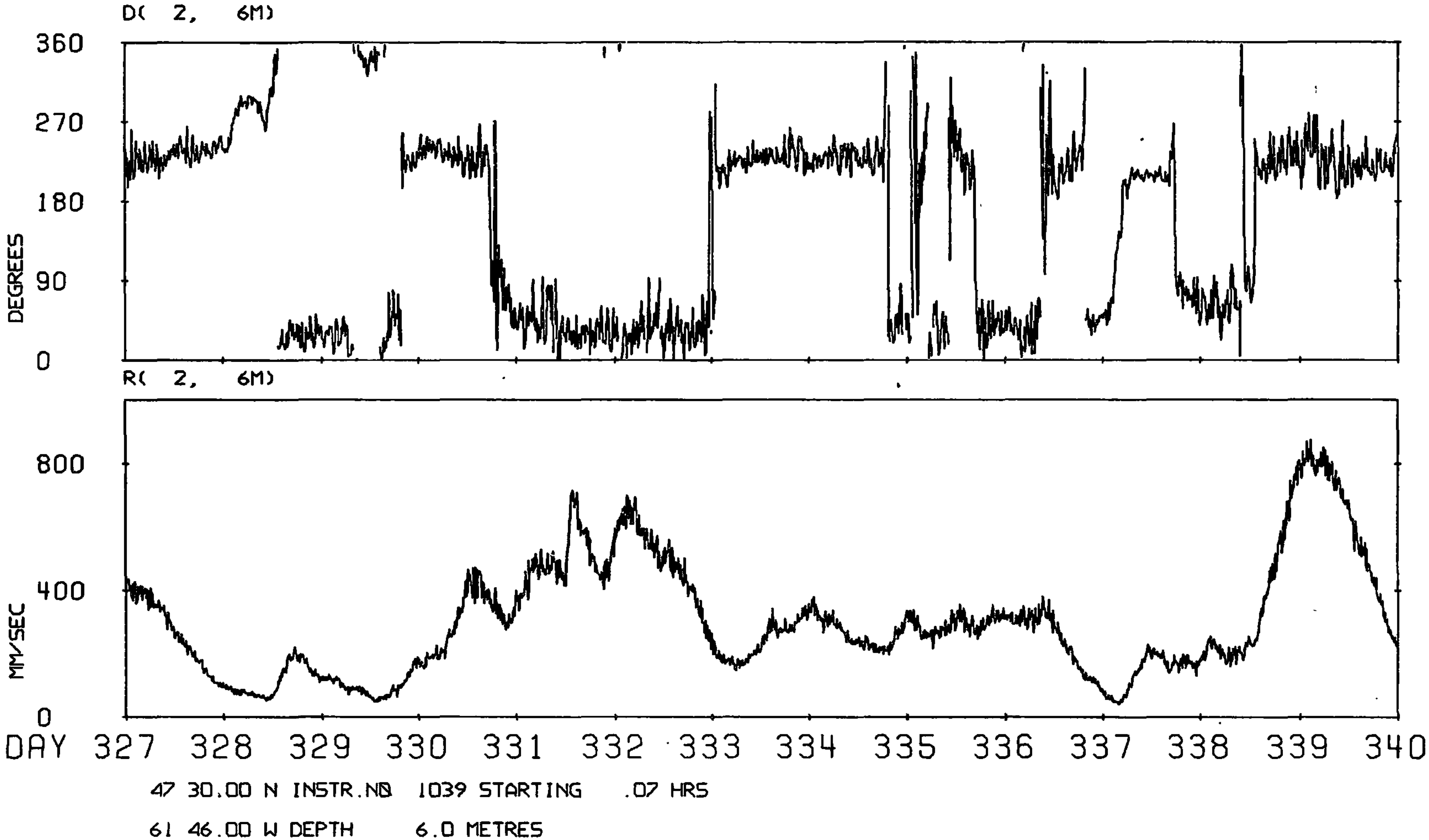


Figure 2.5 (cont'd)

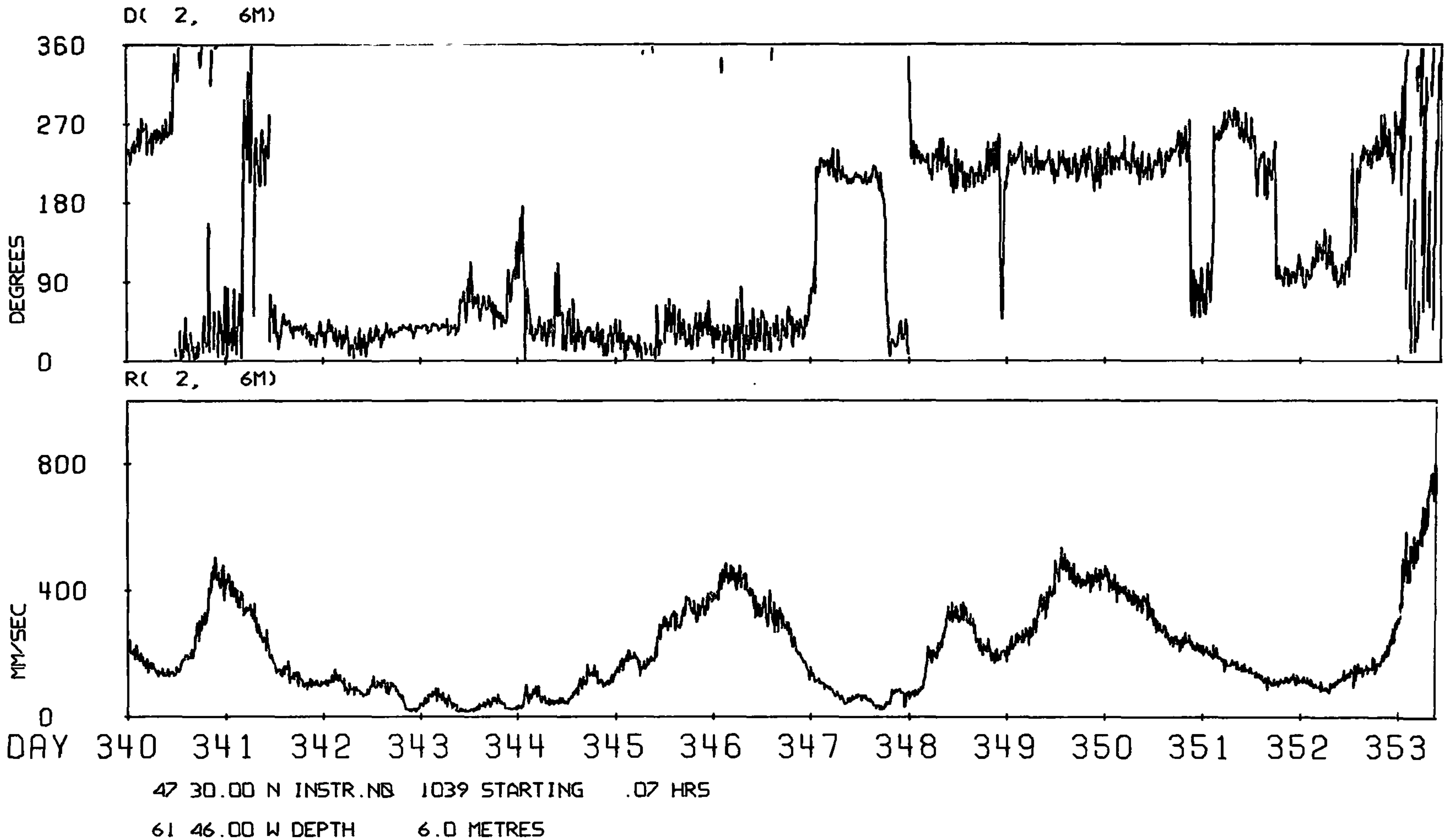


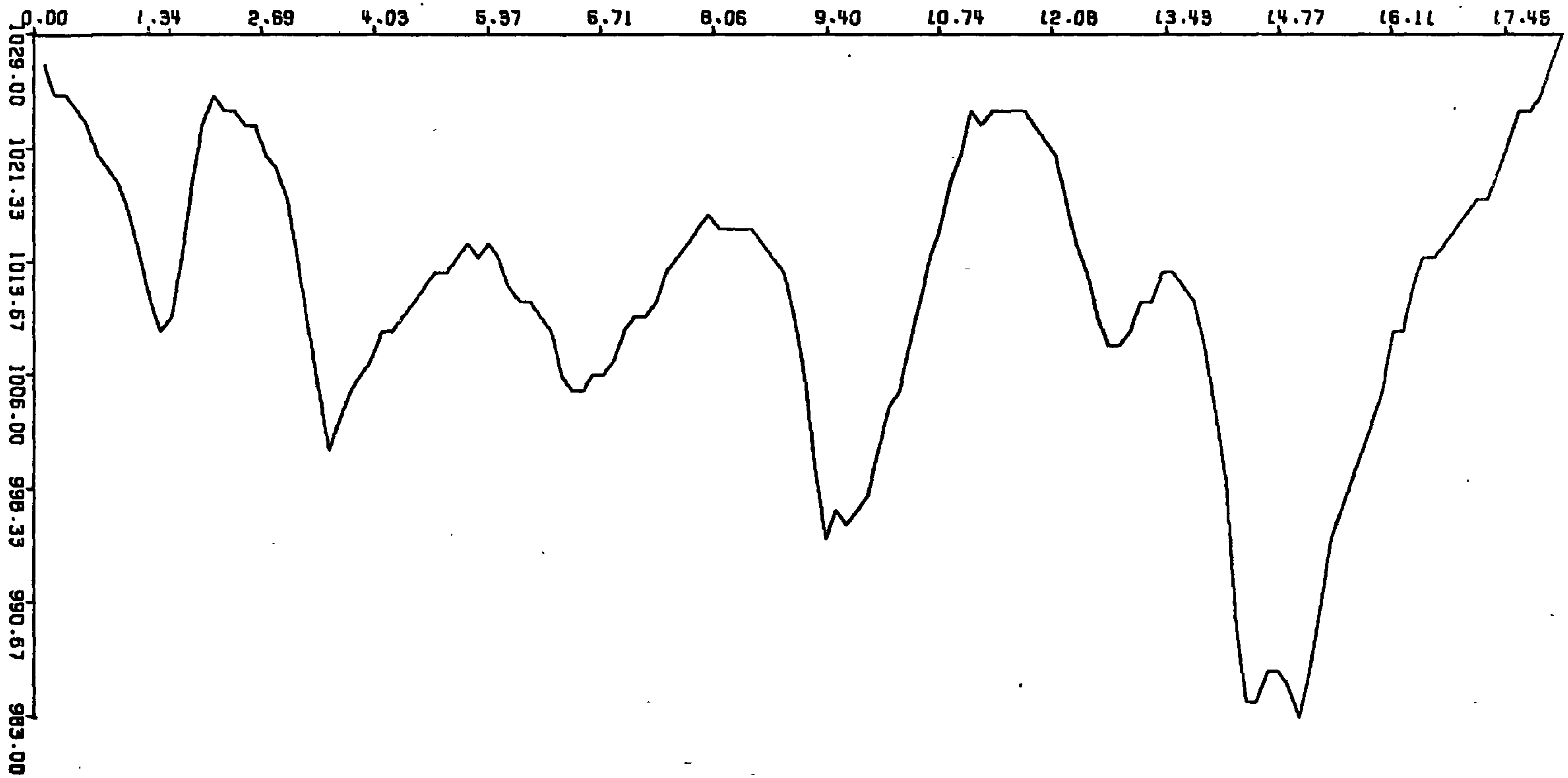
Figure 2.5 (cont'd)

DATA PLOTS

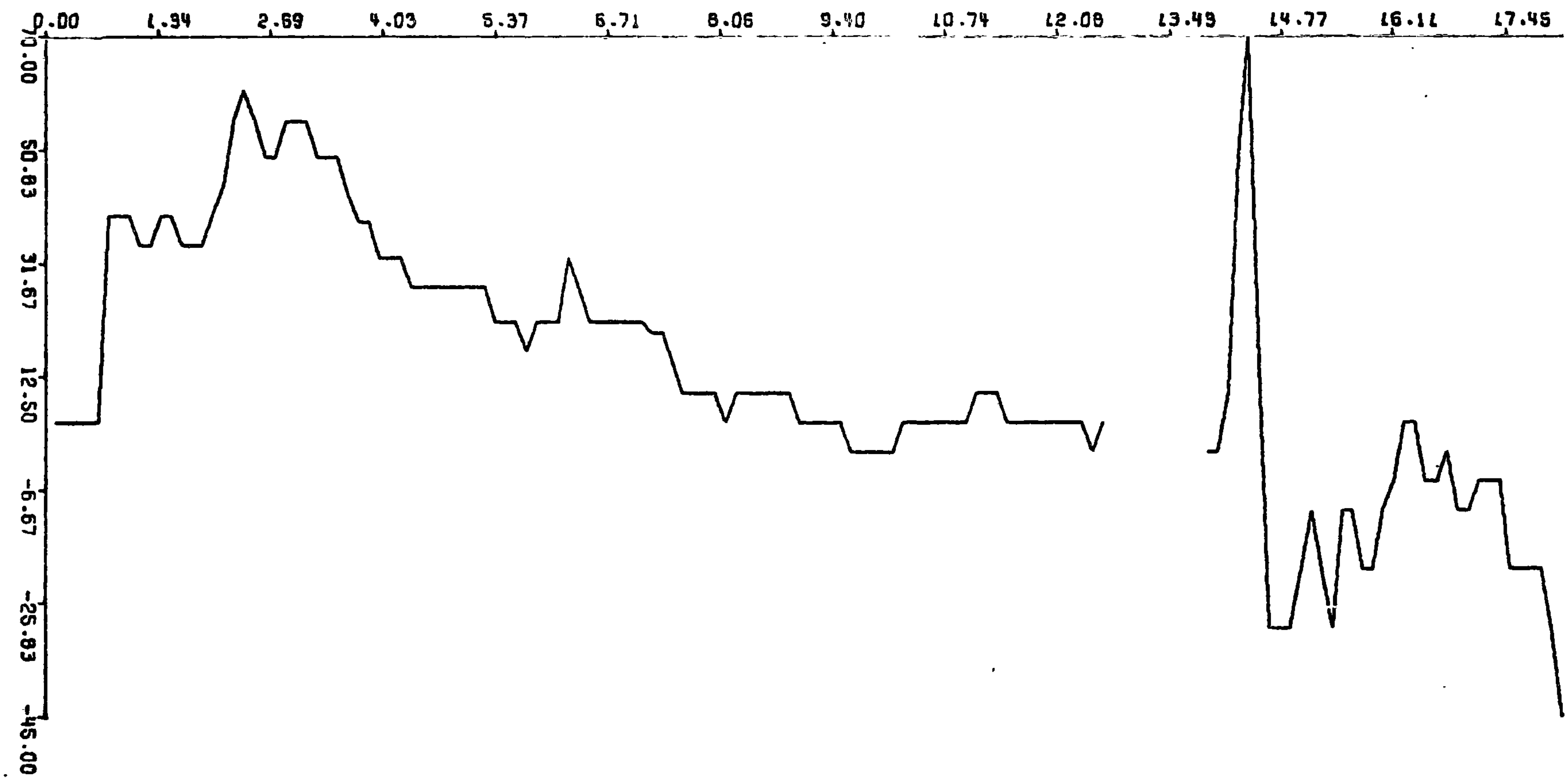
Winter east

BARØMETRIC PRESSURE W2

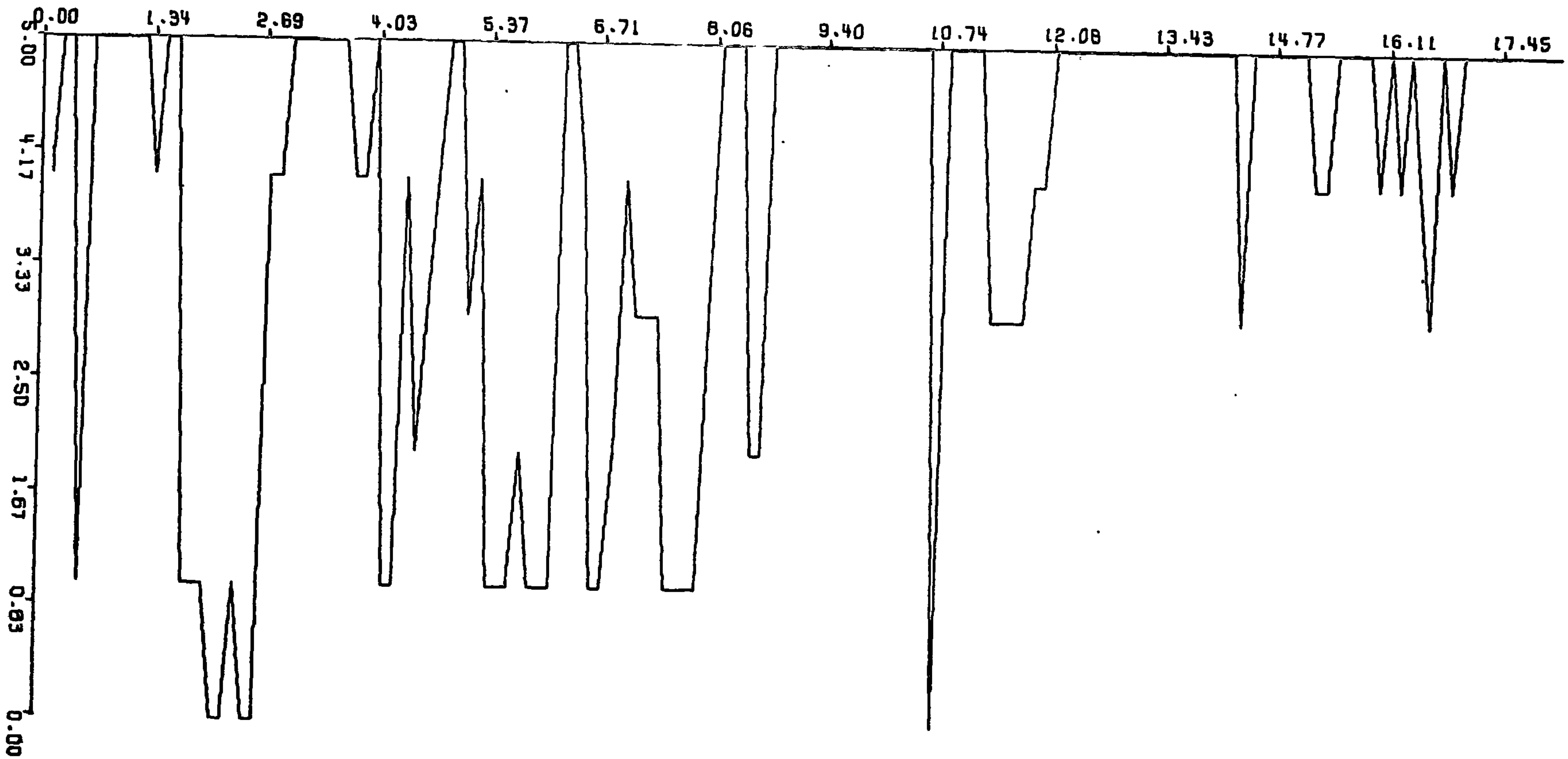
(mb)



AIR TEMPERATURE W2
(°C x10)

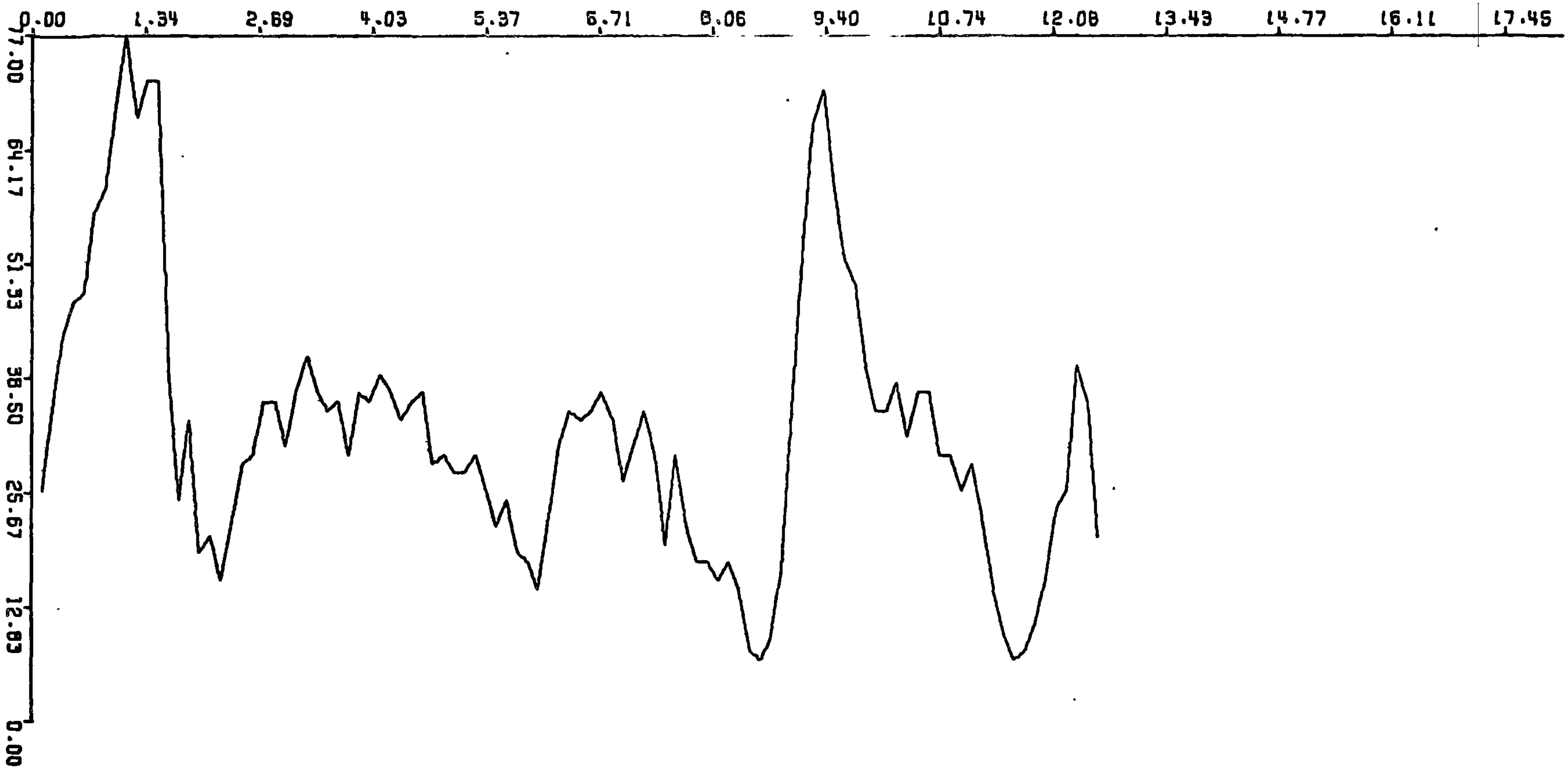


SKY CONDITIONS W2



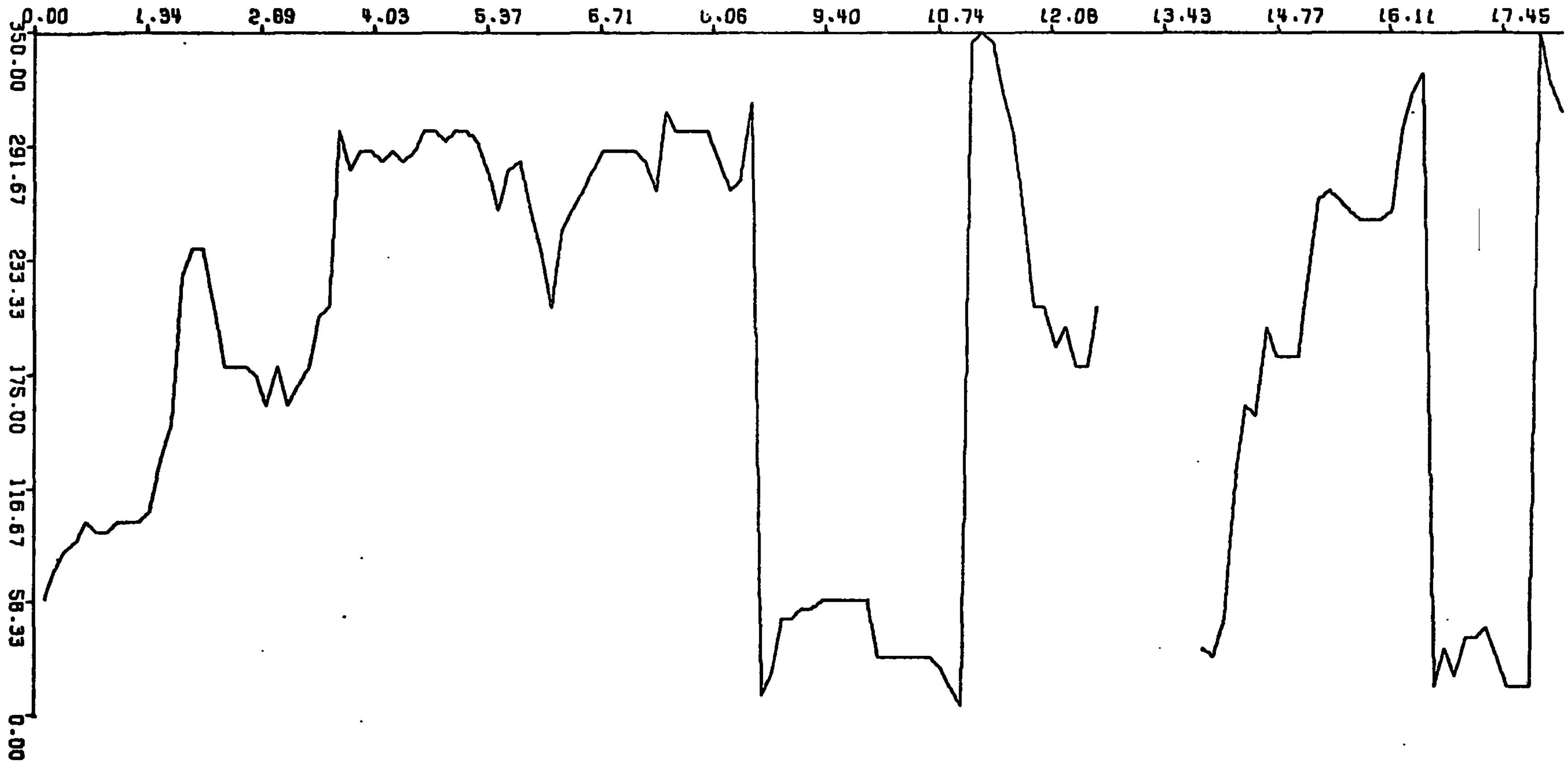
WIND SPEED W2

(km/hr)



WIND DIRECTION W2

(°)

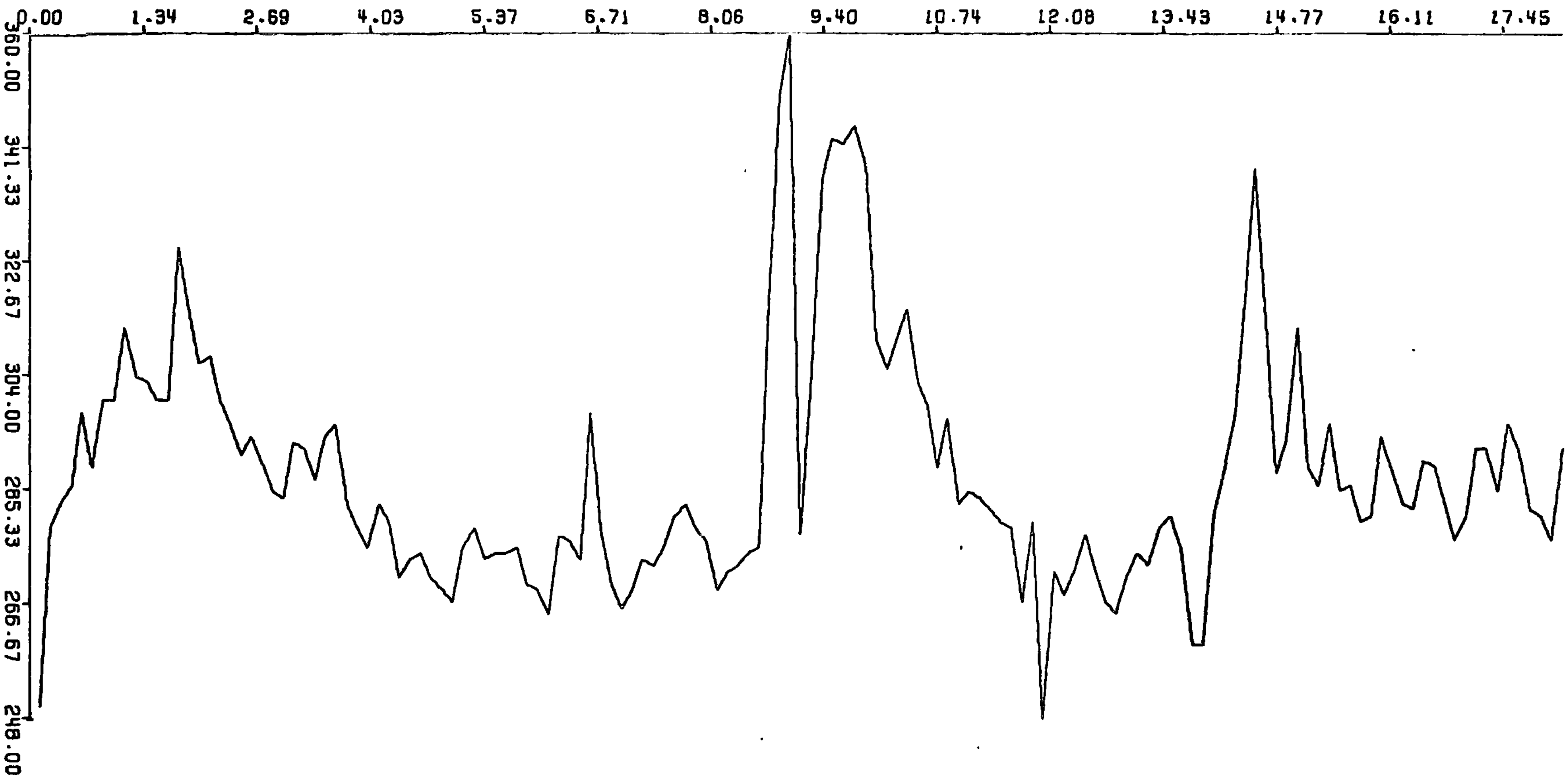


Winter East Water Level

NO DATA

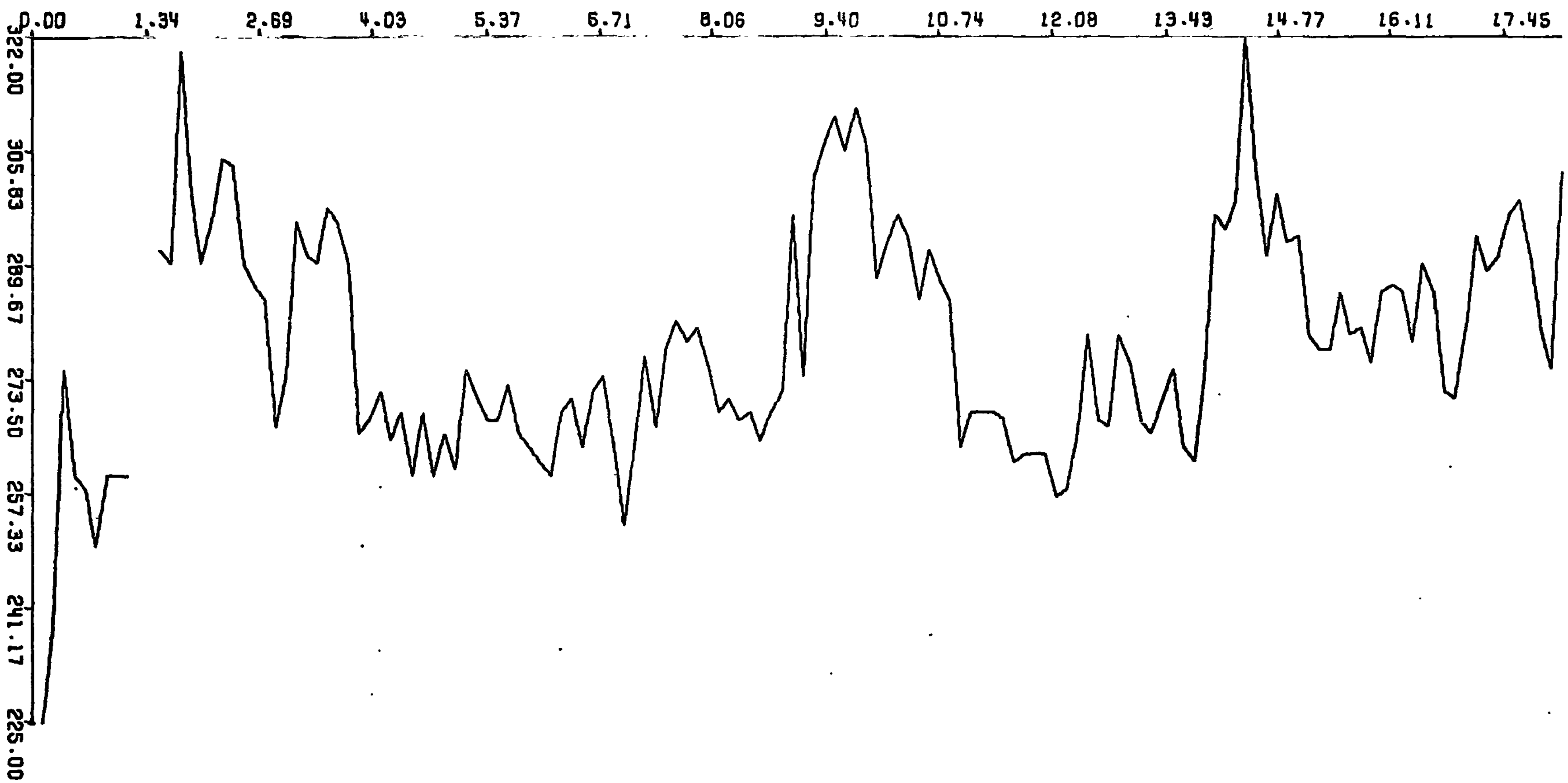
GROUNDWATER LEV 1 W2

(cm)



GROUNDWATER LEV 2 W2

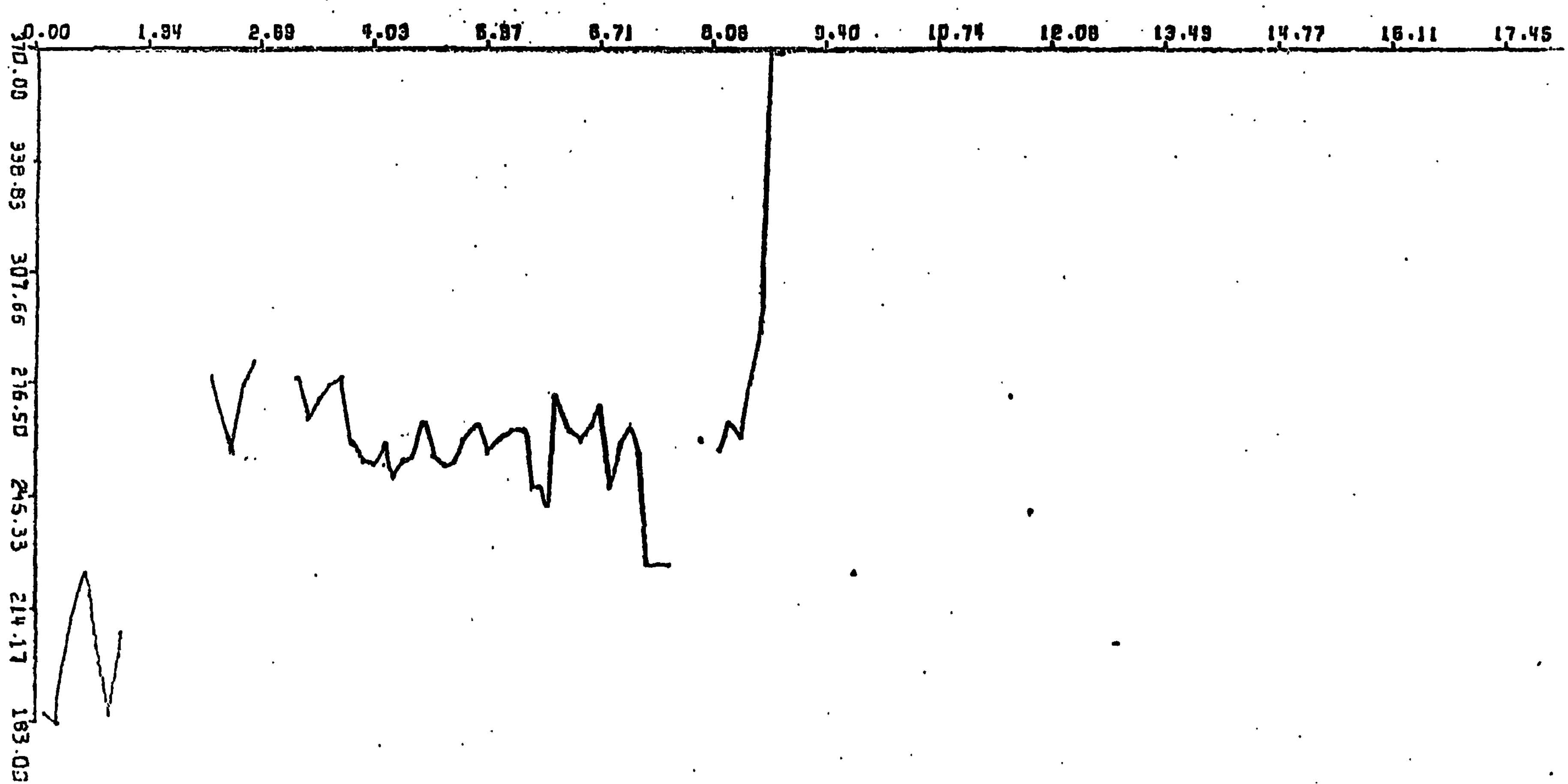
(cm)



111

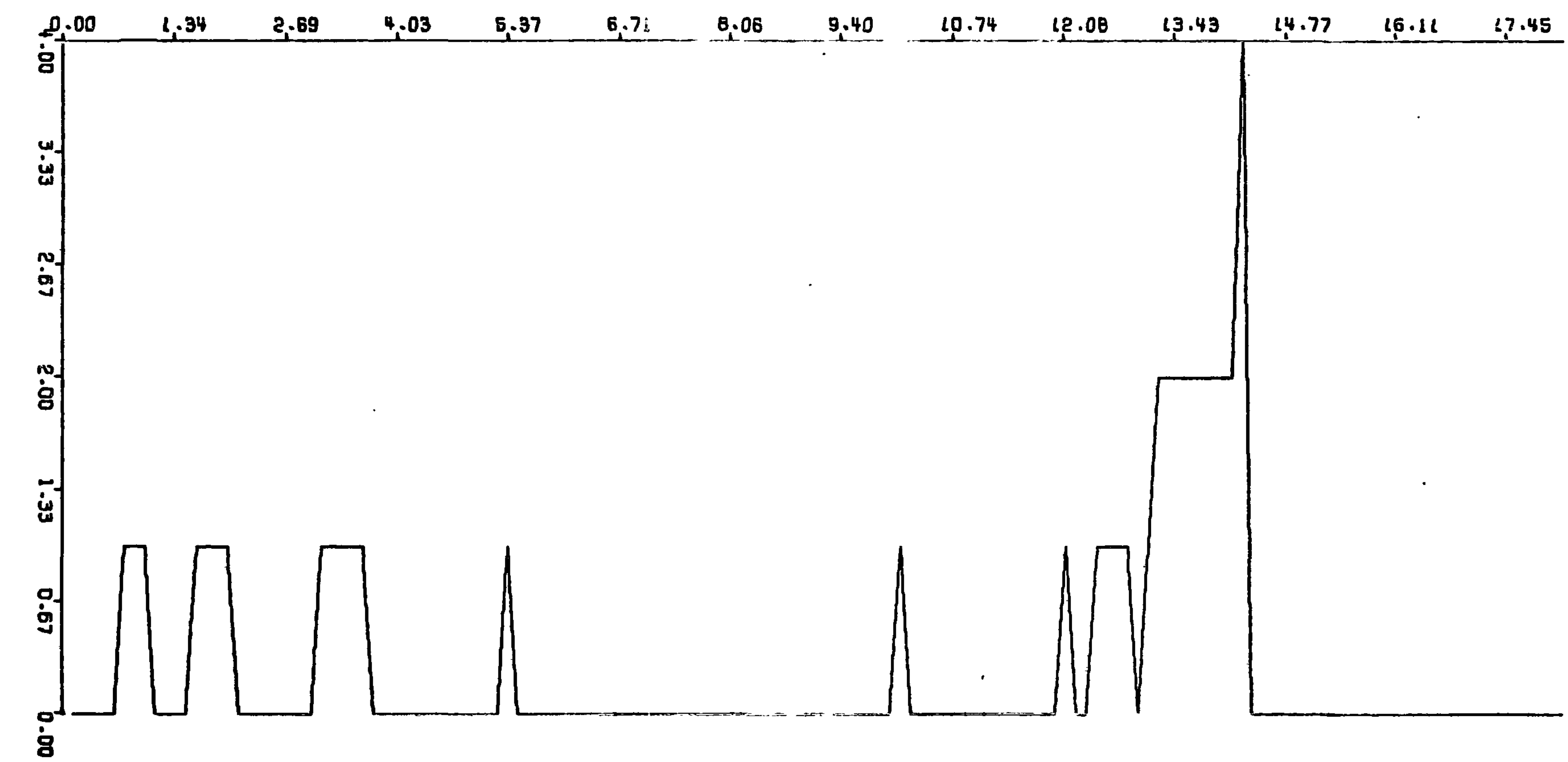
GROUNDWATER LEV 3 W2

(cm)

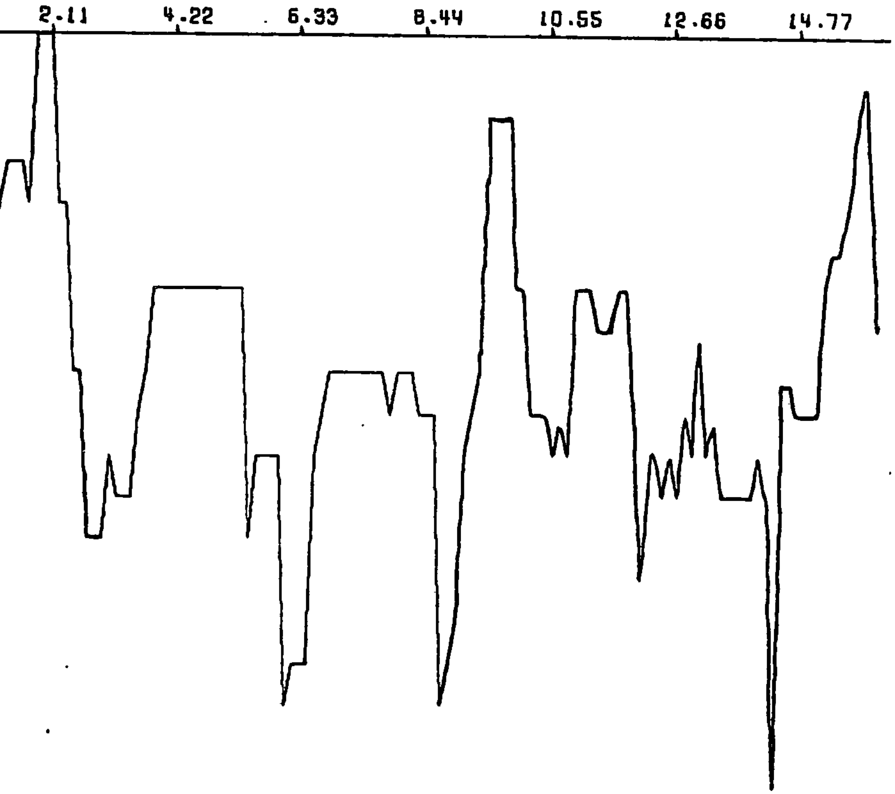


RAINFALL W2

(mm)

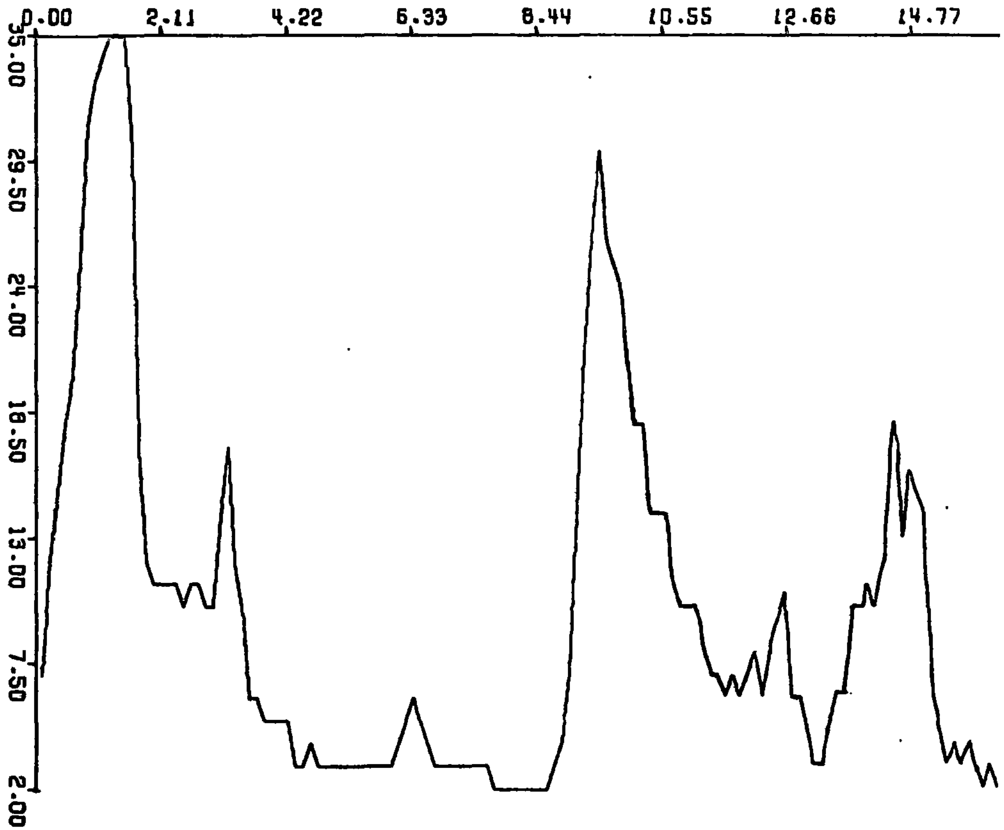


VE PERIOD W2
(sec)



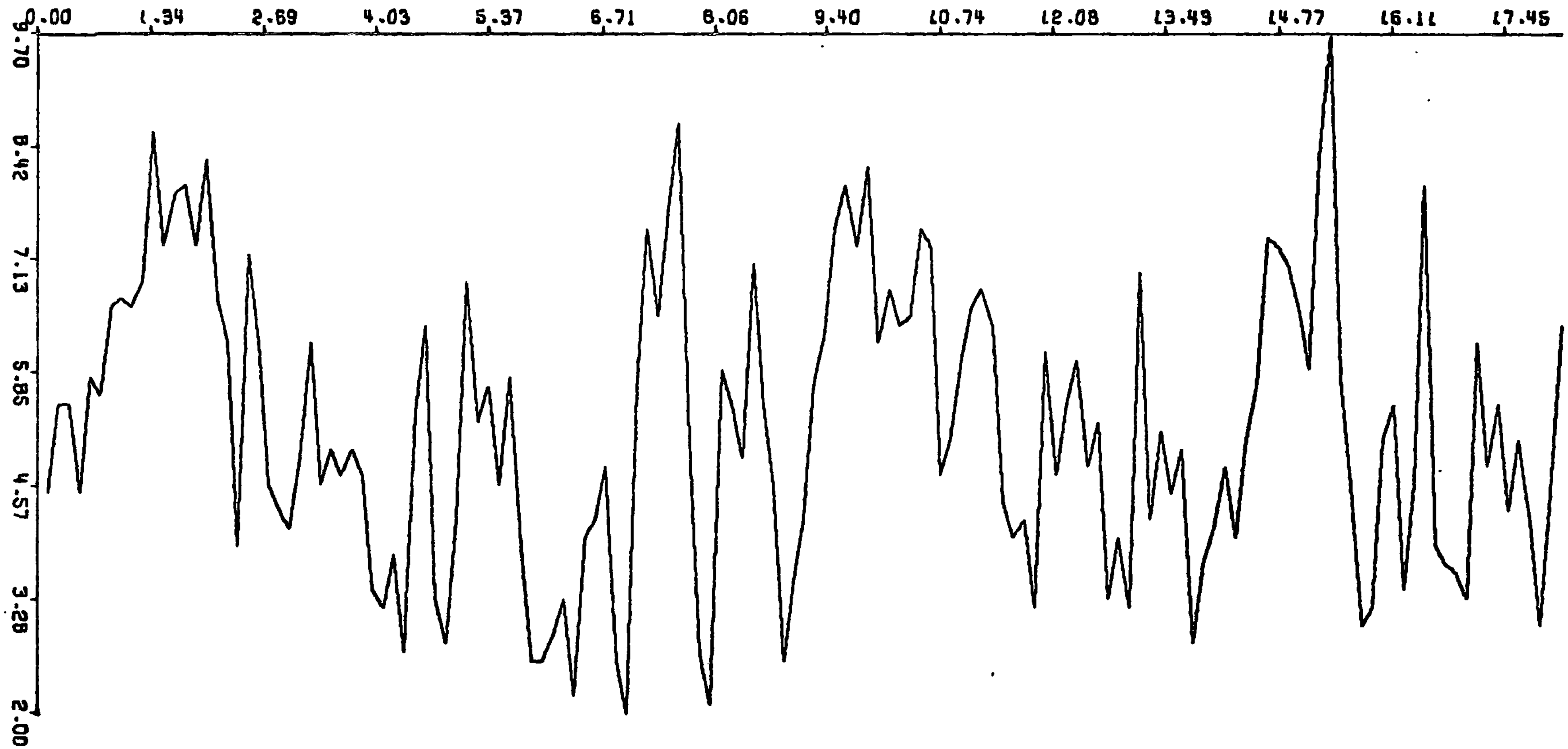
OFFSHORE WAVE HT W2

(decimeters)



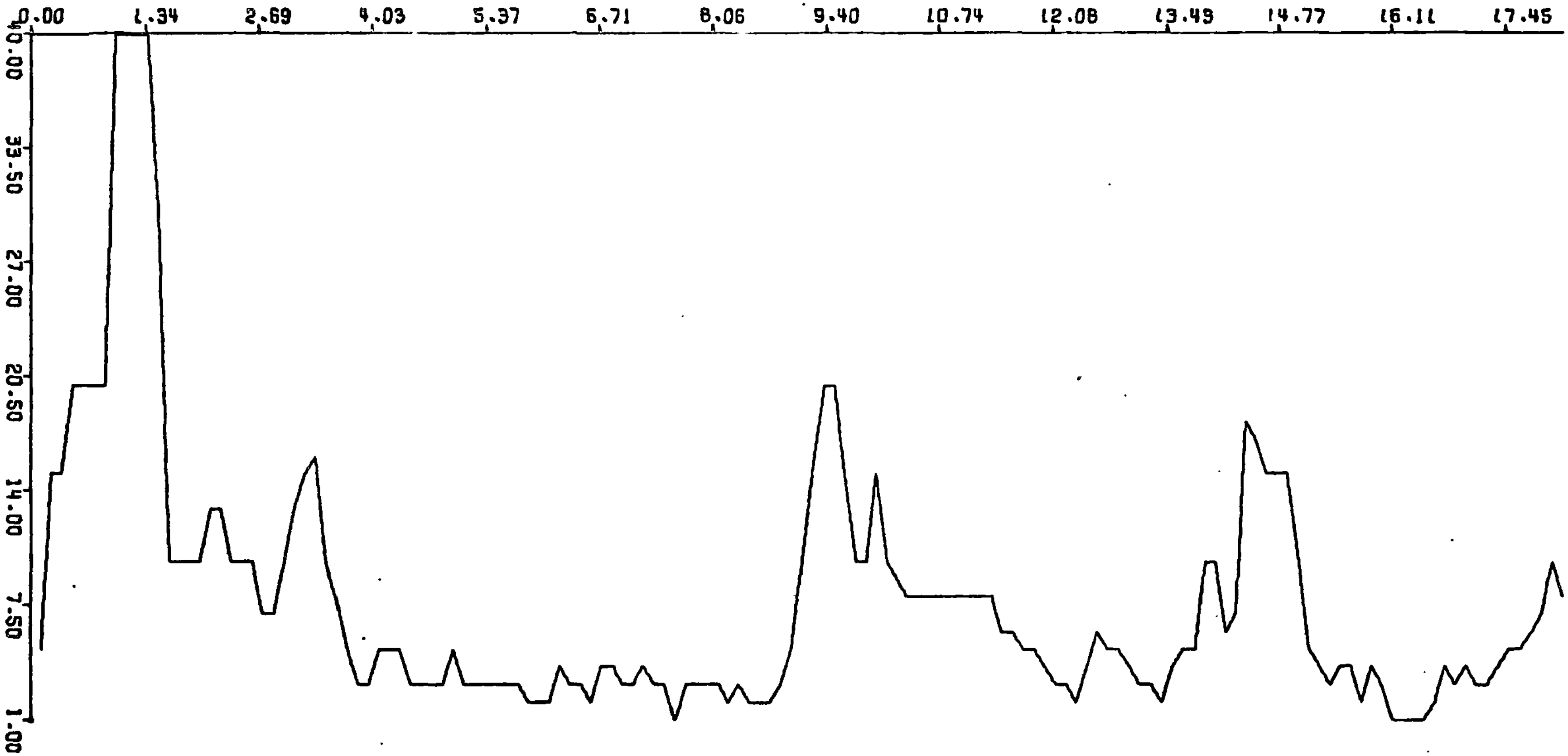
NEARSHORE WAVE PERIOD W2

(sec)

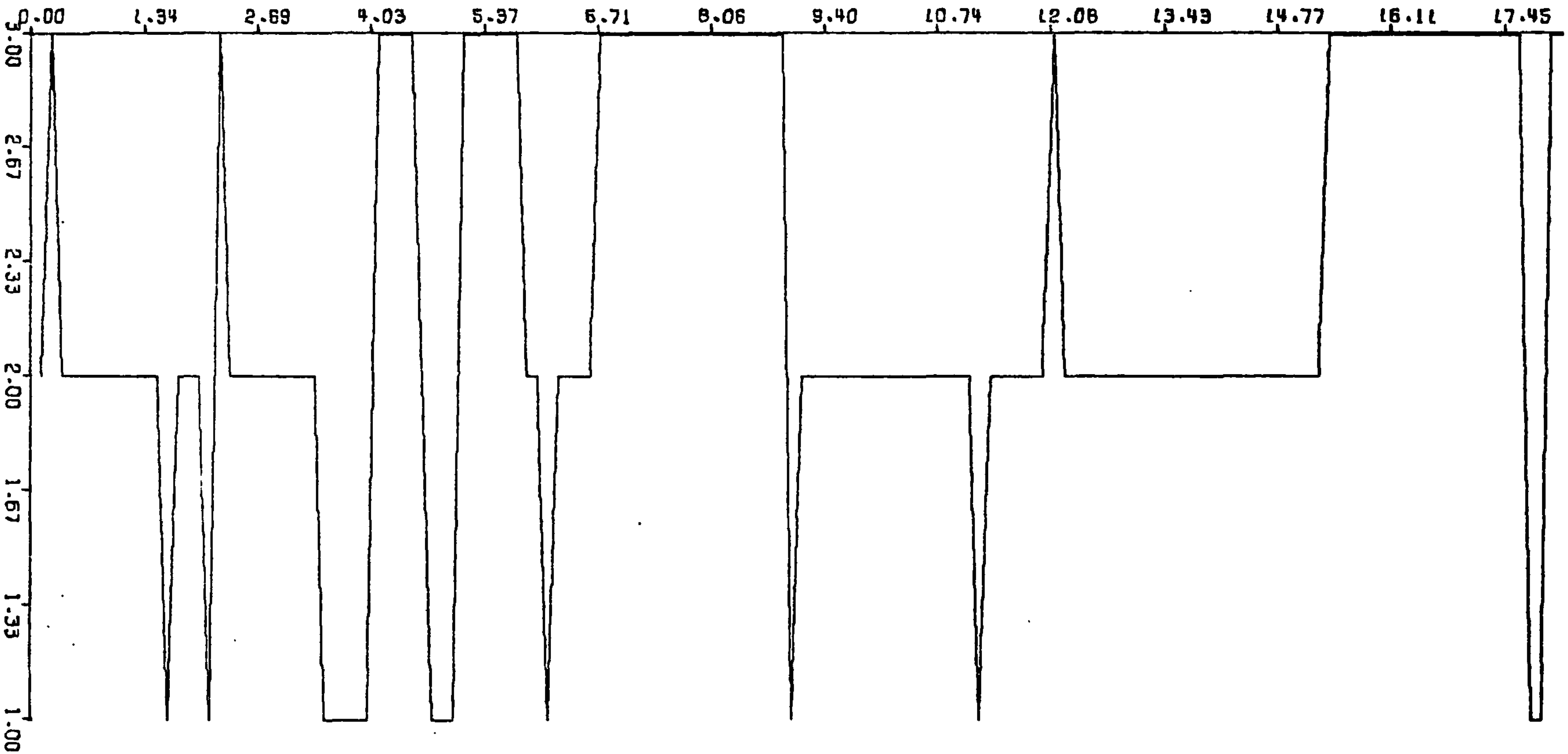


BREAKER HT. W2

(decimeters)

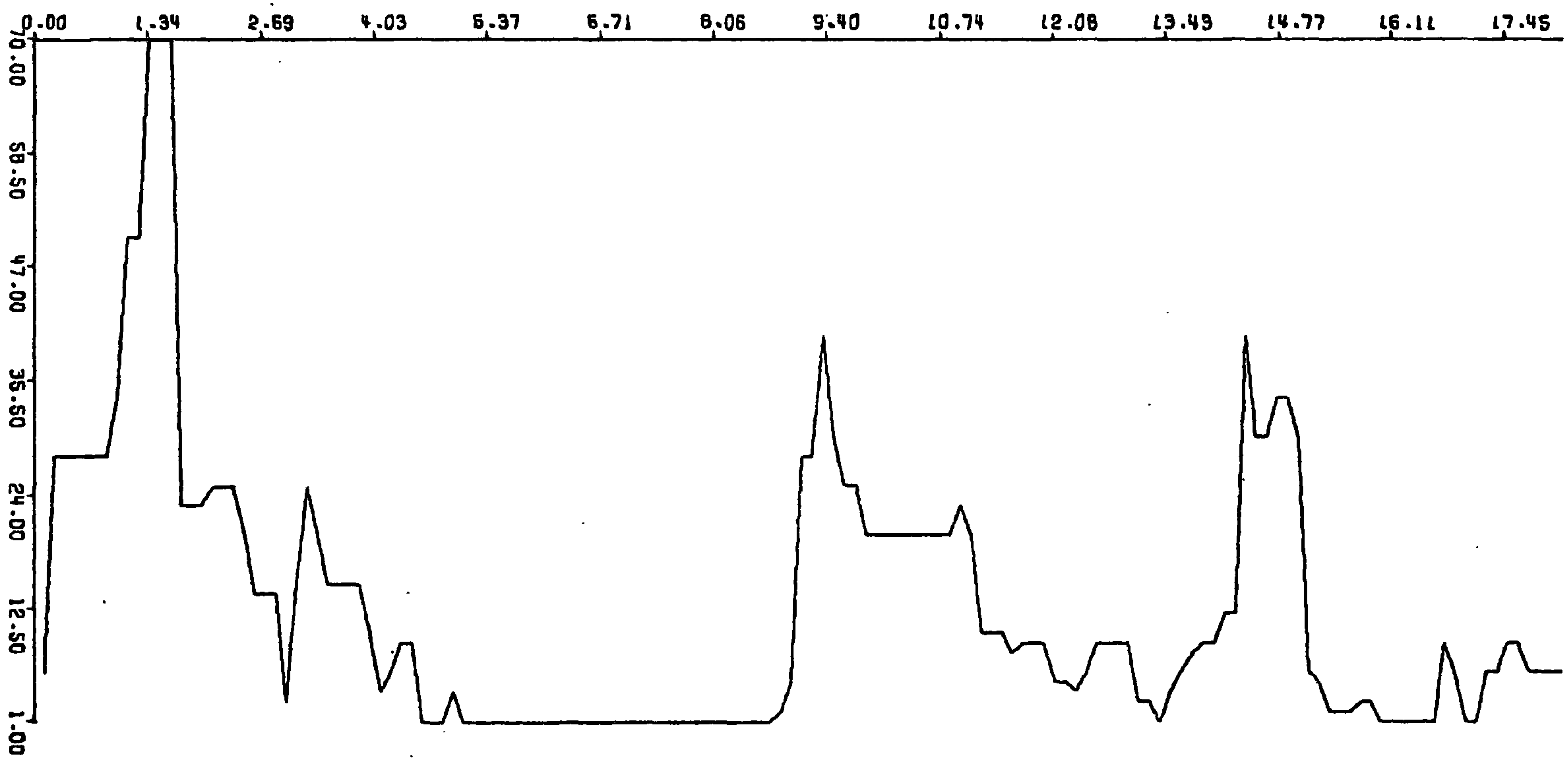


BREAKER TYPE W2

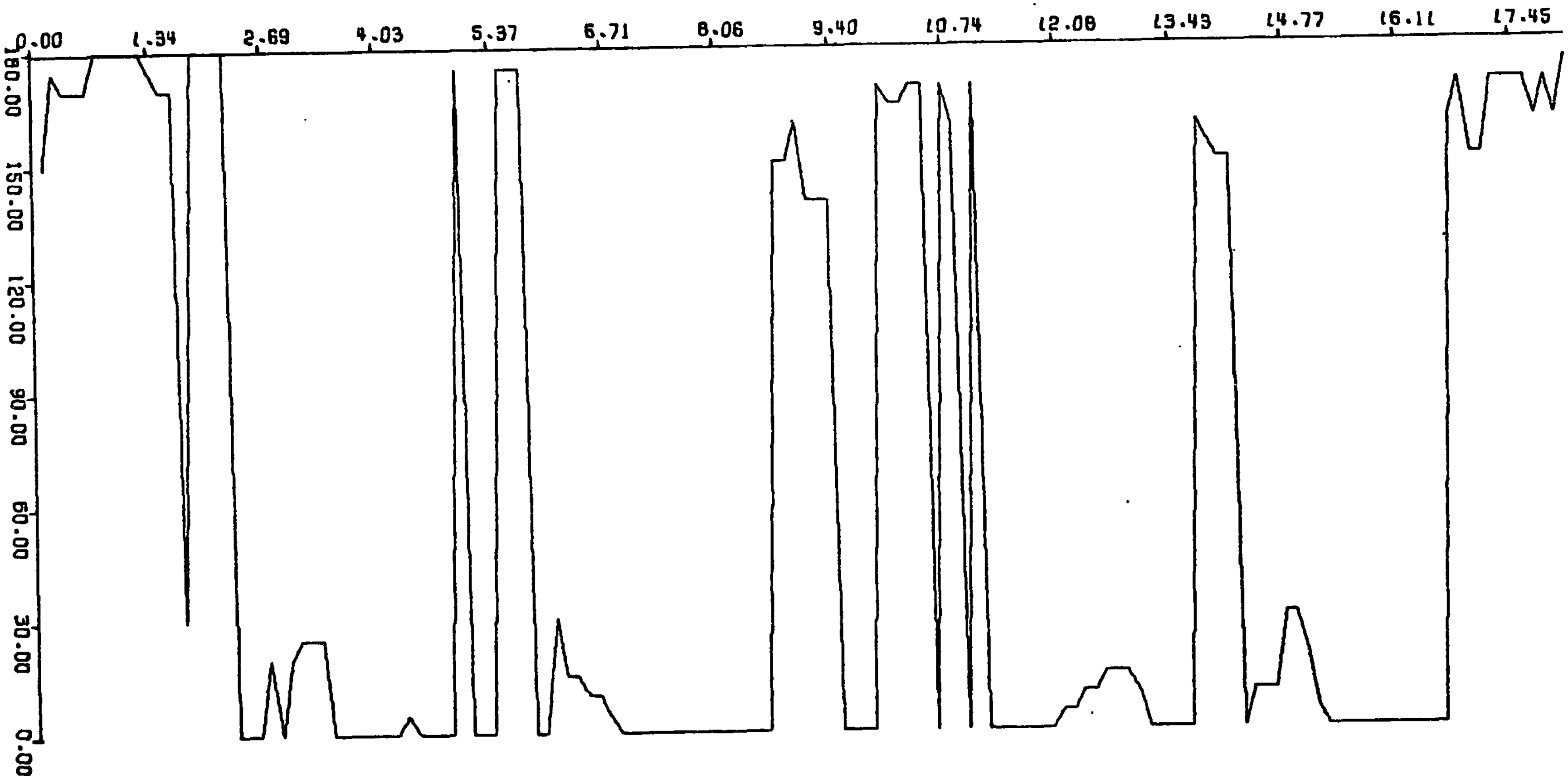


BREAKER DISTANCE W2

(decameters)



BREAKER ANGLE W2
(°)



SELECTED PLOTS OF DATA AND
CUMULATIVE FOURIER CURVES

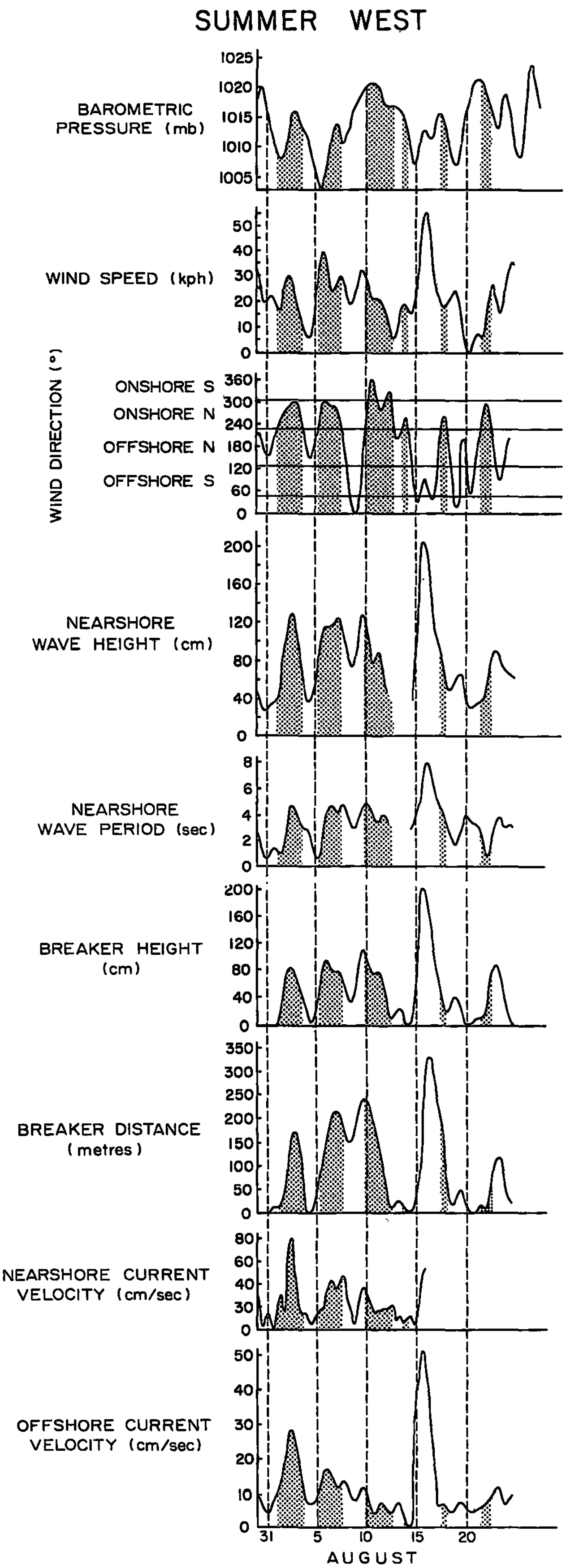


Figure 2.6 Summer west: meteorological and wave variables, and nearshore current data. All data are graphs of the cumulative first 15 Fourier harmonics, except for barometric pressure which is a plot of the real data points. Shaded areas indicate times of onshore winds on the west coast. Current data are from the two Bendix meters.

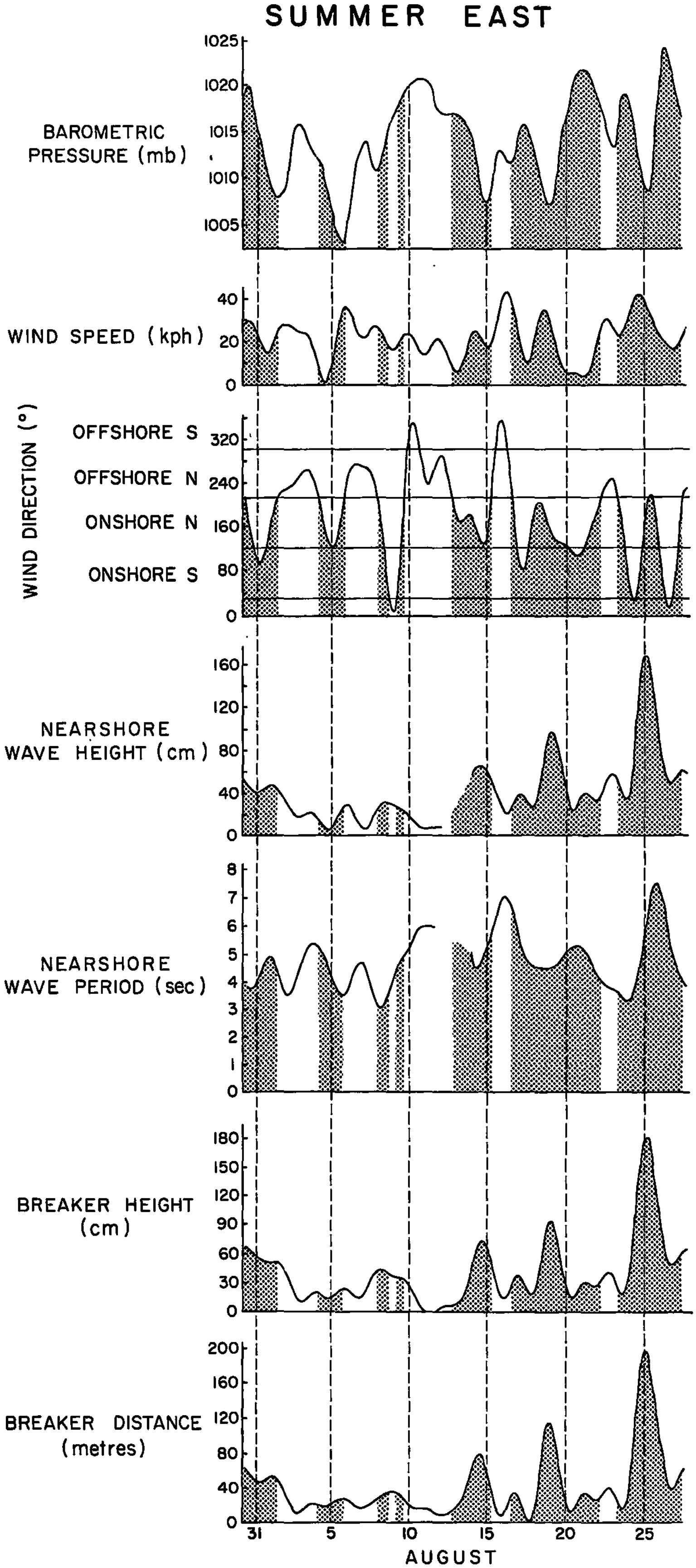


Figure 2.7 Summer east: meteorological and wave variables. All data are graphs of the cumulative first 15 Fourier harmonics, except for barometric pressure which is a plot of the real data points. Shaded areas indicate times of onshore winds on the east coast.

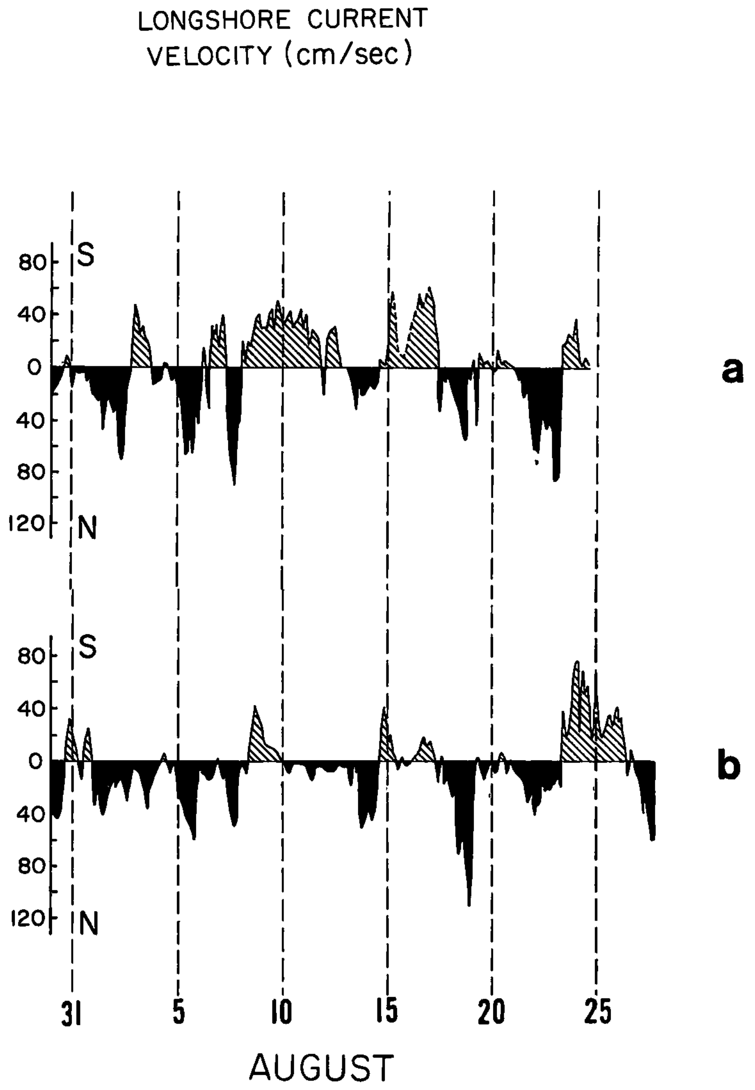


Figure 2.8 Summer longshore current velocity and direction for the west (a) and east (b) study sites.

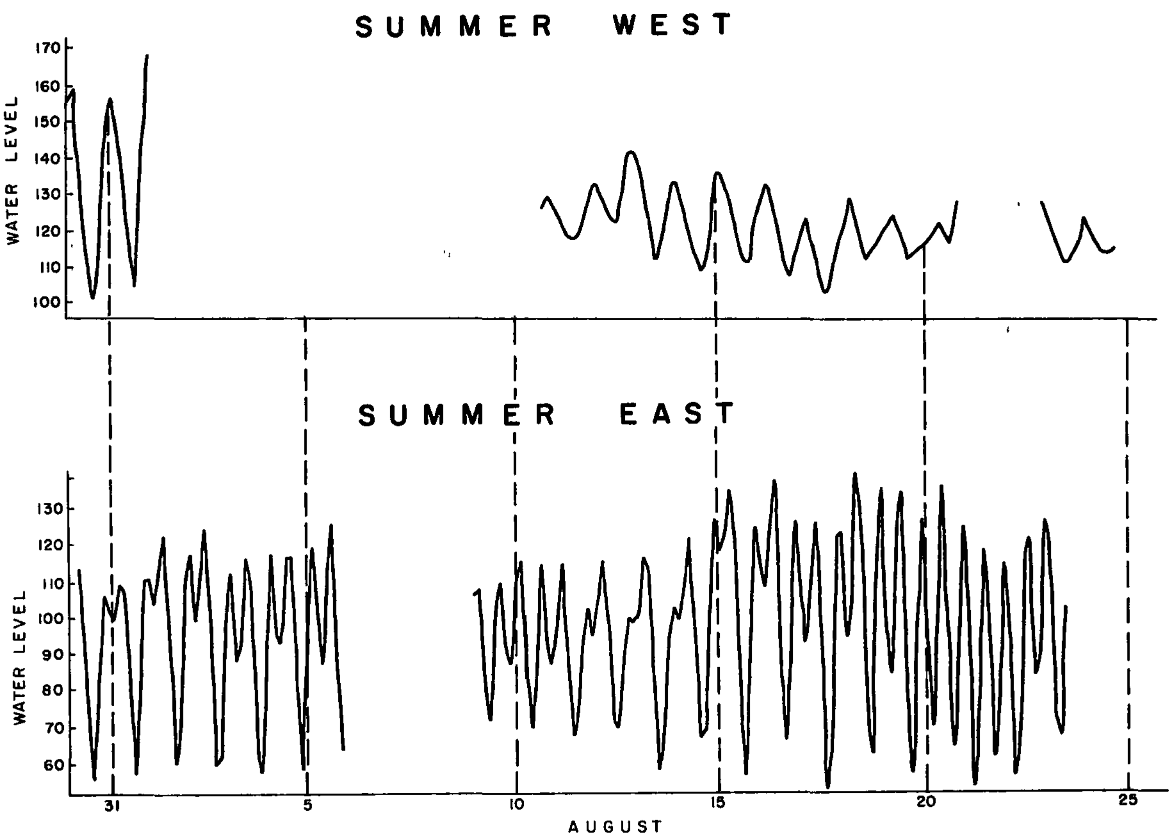


Figure 2.9 Summer tide records: west (Pointe au Loup) and east (Dune du Sud) sites. The vertical scales refer to relative water level elevations (in cm) and were not surveyed with reference to the same datum plane.

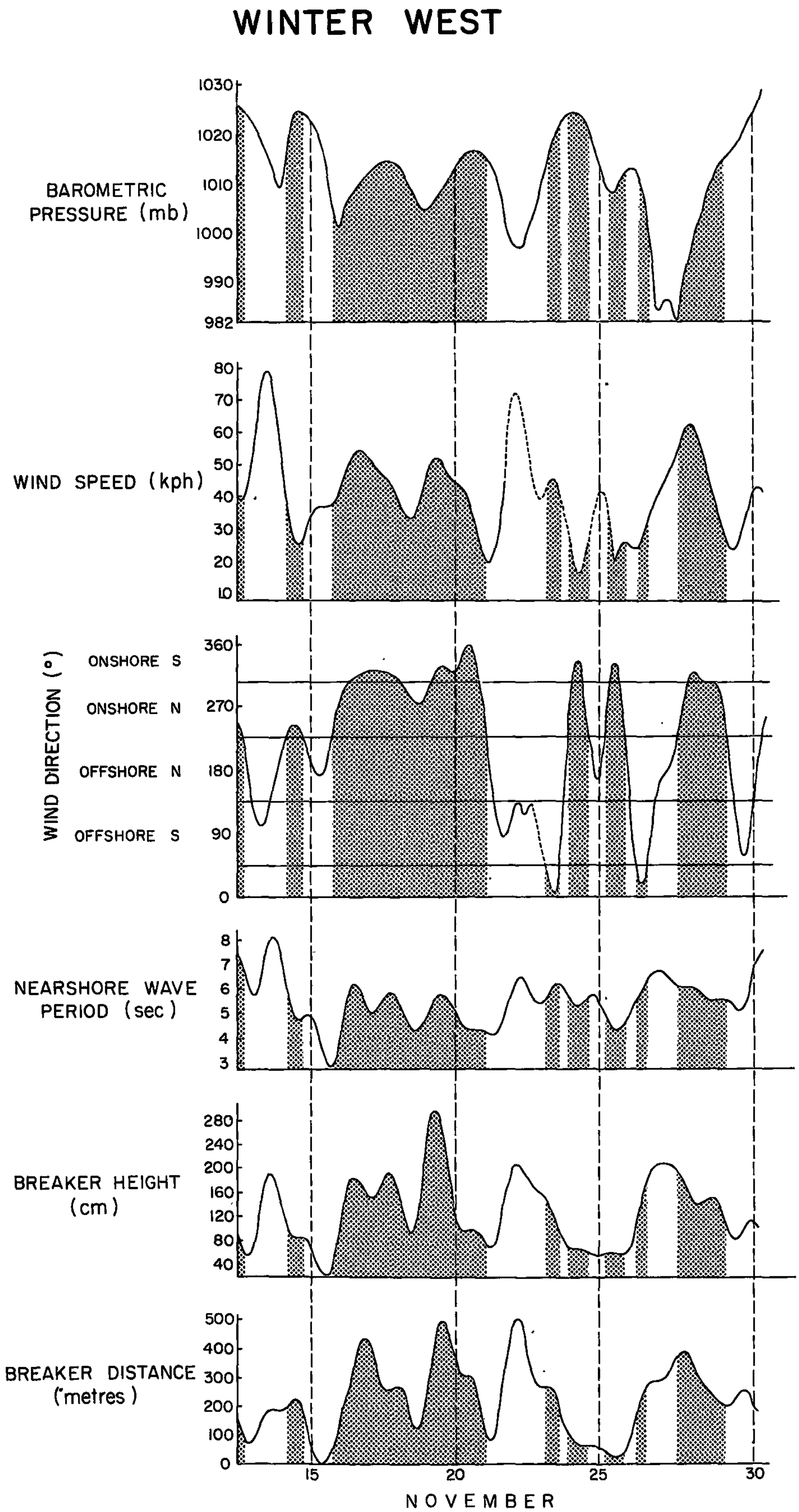


Figure 2.10 Winter west: meteorological and wave variables. All data are graphs of the cumulative first 15 Fourier harmonics, except for barometric pressure which is a plot of the real data points. Gaps in the wind data are interpolated from observations at the east site weather station. Shaded areas indicate times of onshore winds on the west coast.

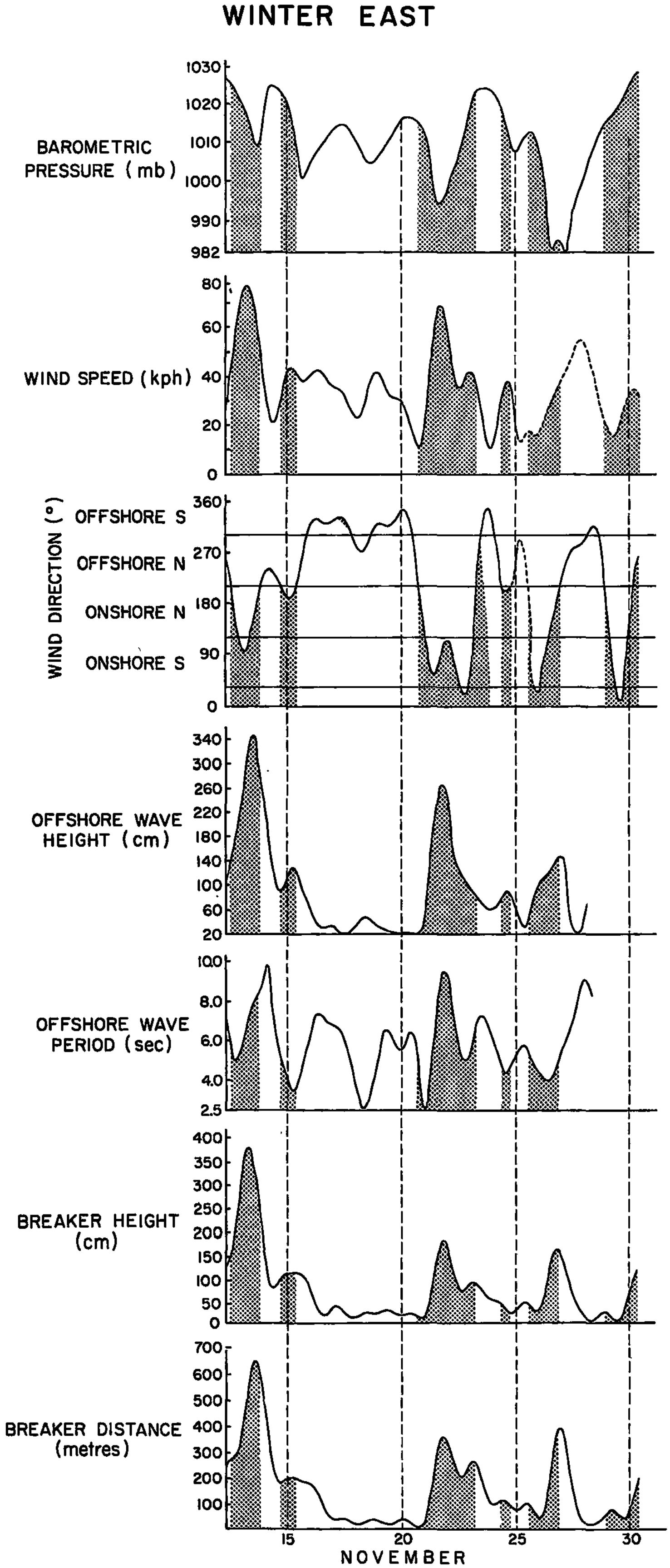


Figure 2.11 Winter east: meteorological and wave variables. All data are graphs of the cumulative first 15 Fourier harmonics, except for barometric pressure which is a plot of the real data points. Gaps in the wind data are interpolated from observations at the west site weather station. Shaded areas indicate times of onshore winds on the east coast.

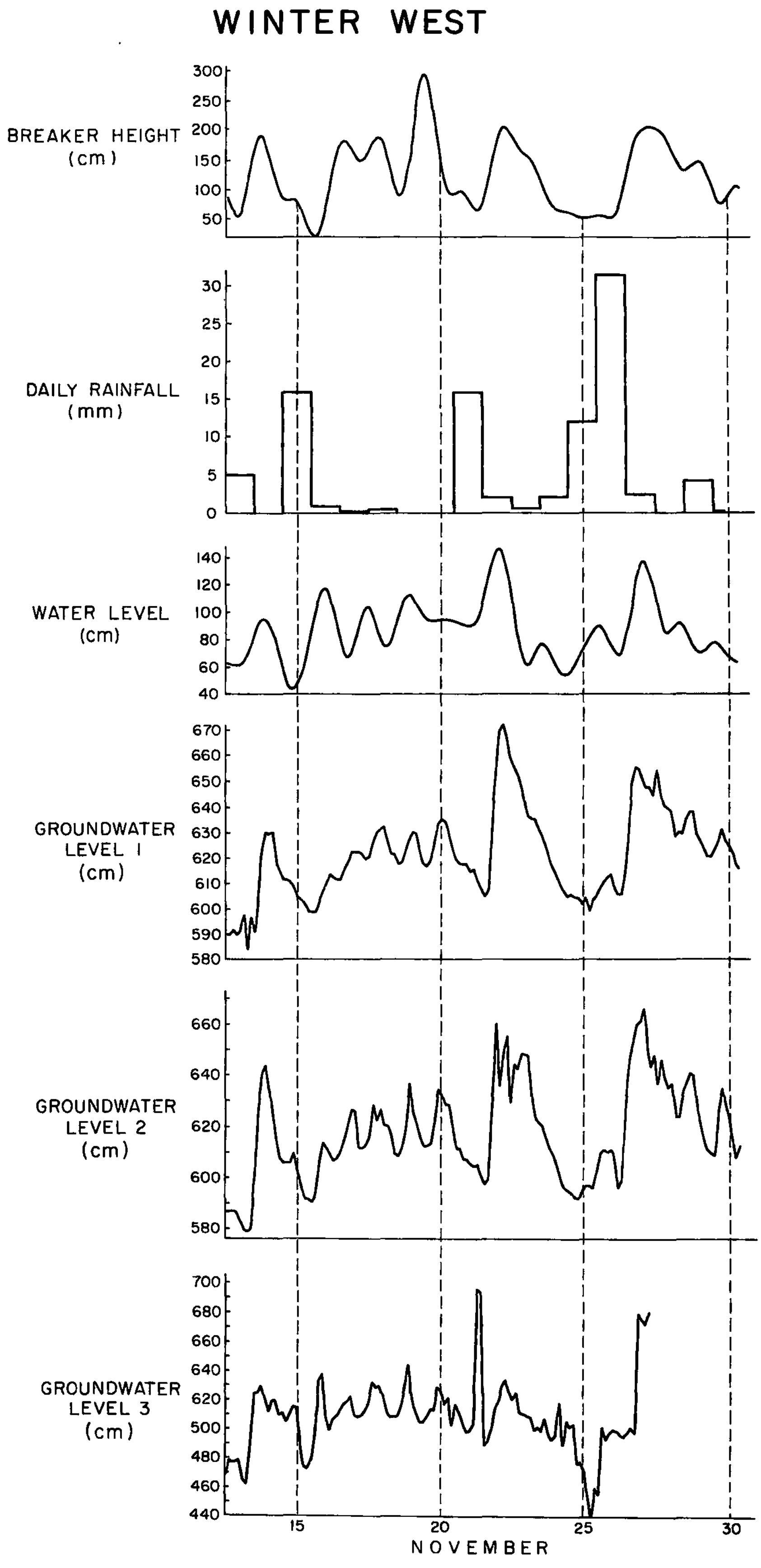


Figure 2.12 Winter west: breaker height, precipitation, water level and groundwater elevations. Breaker height and water level are graphs of the cumulative first 15 Fourier harmonics. Rainfall is presented as a histogram of the 24-hour total precipitation at the Grindstone weather station. Groundwater elevations are shown as plots of the observed data with reference to the west site datum plane.

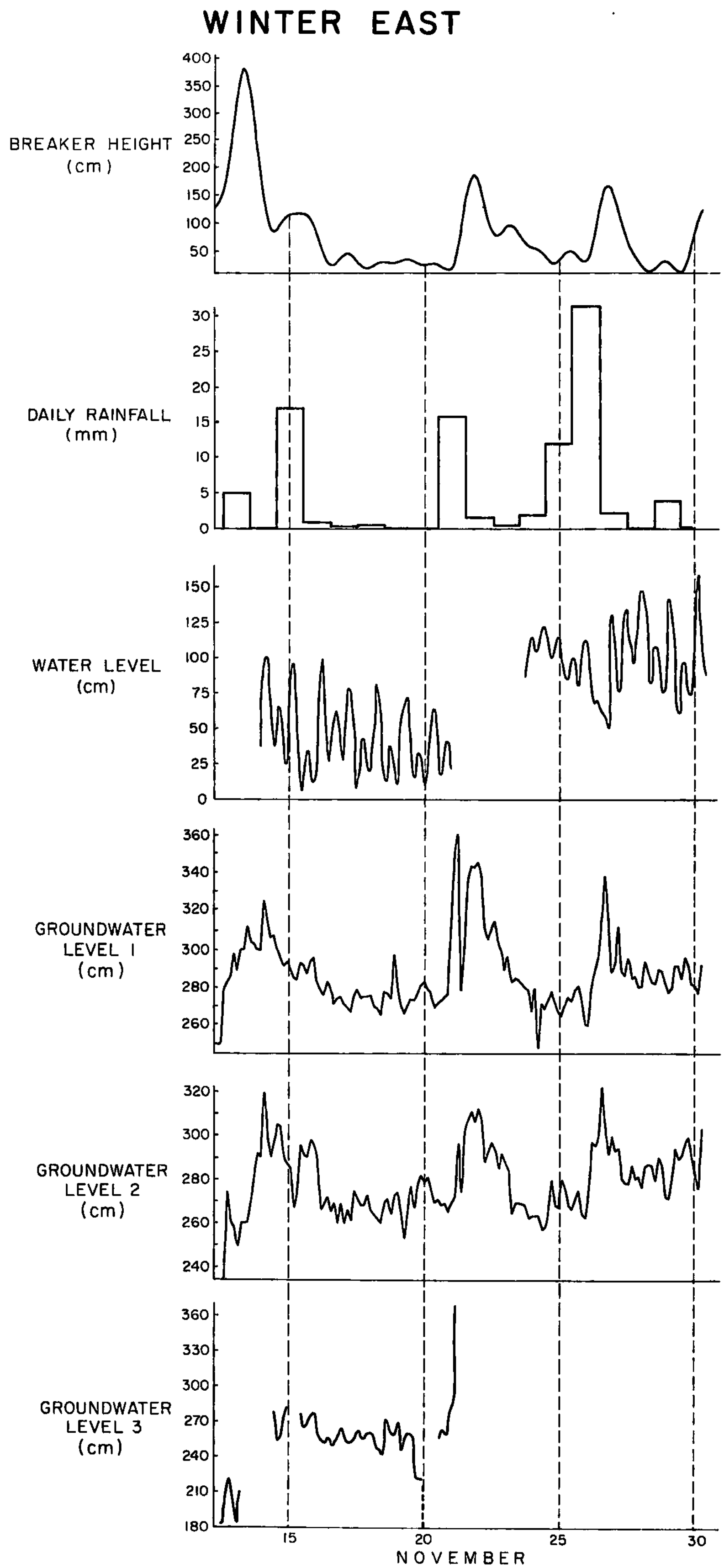


Figure 2.13 Winter east: breaker height, precipitation, water level and groundwater elevations. Breaker height is a graph of the cumulative first 15 Fourier harmonics. Water level is derived from the Grindstone tide gauge. Rainfall is presented as a histogram of the 24-hour total precipitation at the Grindstone weather station. Groundwater elevations are given as plots of the observed data relative to the east site datum plane.

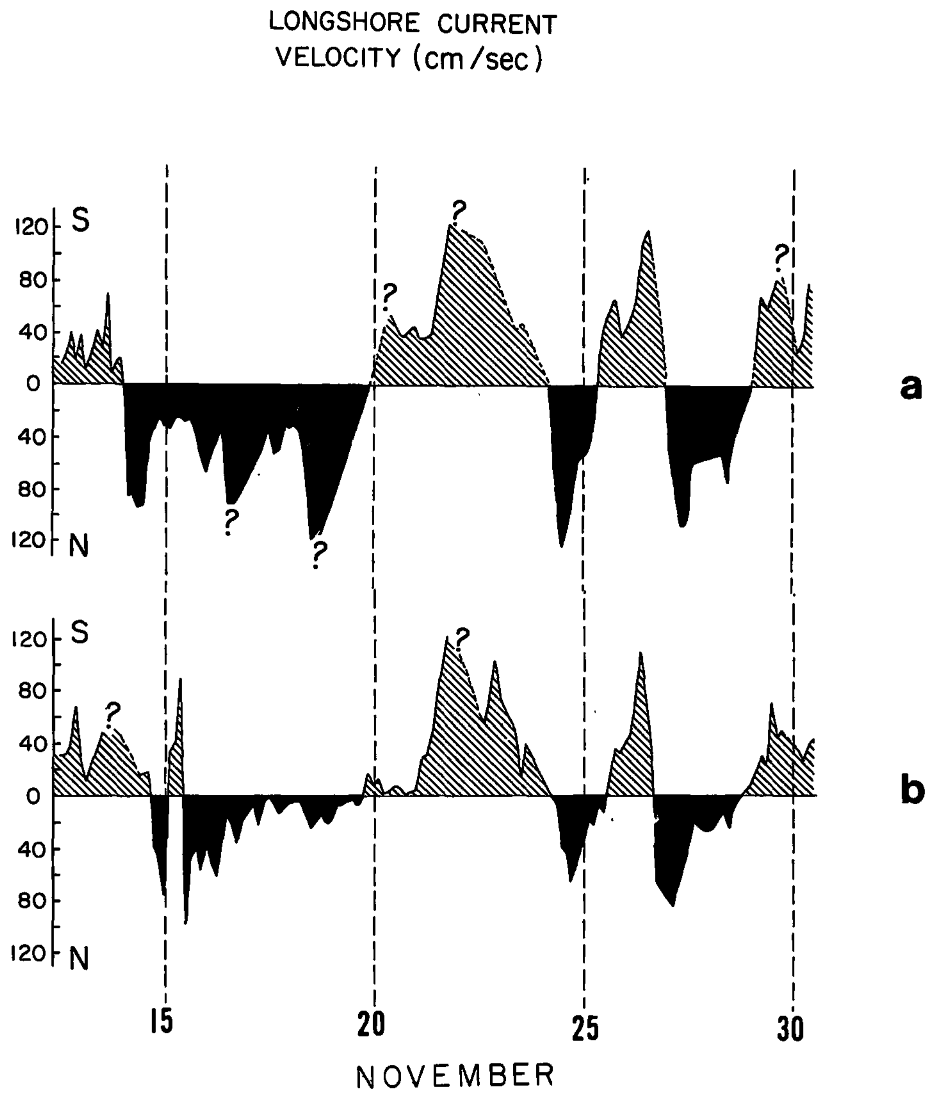


Figure 2.14 Winter longshore current velocity and direction for the west (a) and east (b) study sites.

	SUMMER		WINTER	
	West (S1)	East (S2)	West (W1)	East (W2)
Barometric Pressure	p. 46 (122)	p. 68 (123)	84 (126)	104 (127)
Air Temperature	47	69	85	105
Sky Condition	48	70	86	106
Wind Velocity	49 (122)	71 (123)	87 (126)	107 (127)
Wind Direction	50 (122)	72 (123)	88 (126)	108 (127)
Water Level	51 125	73 125	21 89 (21) (128)	129
Groundwater Level 1	-	-	90 128	110 129
Groundwater Level 2	-	-	91 128	111 129
Groundwater Level 3	-	-	92 128	112 129
Rainfall	52	74	93 128	113 129
Offshore Wave Period	53	75	-	114 (127)
Offshore Wave Height	54	76	-	115 (127)
Nearshore Wave Period	55 (122)	77 (123)	94 (126)	116
Nearshore Wave Height	56 (122)	78 (123)	-	-
Breaker Height	57 (122)	79 (123)	95 (126) (128)	117 (127) (129)
Breaker Type	58	80	96	118
Breaker Distance	59 (122)	81 (123)	97 (126)	119 (127)
Breaker Angle	60	82	98	120
Offshore Cur. Vel/Dir(CV/CD1)	61	-	99/101	-
Offshore Cur. Vel. (CV2)	19 62 (122)	-	-	-
Offshore Cur. Dir. (CD2)	63	-	-	-
Nearshore Cur. Vel. (CV3)	19 64 (122)	-	-	-
Nearshore Cur. Dir. (CD3)	65	-	-	-
Longshore Cur. Vel/Dir(CV/CD4)	124	124	130	130

Table 2.3 Location index of data and Fourier plots (Fourier plots are bracketed)

PART 3

COMPUTED WAVE POWER VALUES

CONTENTS

Derivation of Values:

Wave power values (E) for each cm^2 surface area of the incoming wave was computed from:

$$E = \frac{\rho g H^2 rms}{8} \cdot \frac{10800}{T} \text{ ergs/cm}^2\text{/3 hours} \qquad (1)$$

where: $H_{rms} = \sqrt{\frac{H^2\ sign}{2}}$, ρ is the density of sea water and g is the acceleration of gravity (2)

No wave data were obtained from the west study site during the winter phase and H_{sign} is derived from:

$$H_{sign} = H_b 0.927 + 20.94 \qquad (3)$$

where H_b is the breaker height. This linear regression coefficient was obtained by comparing observed breaker height and measured wave height values from the east site during the winter phase.

Data Format:

The data are presented as computer print-out tables of the variables and the computed values in the sequence summer west, summer east, winter west and winter east. Figure 3.1 is a plot of the log values of the data and a summary of the data is given in Table 3.1.

TABLE 3.1

Summary of wave power values

		Wave power (ergs/cm²/3 hours)		
		Mean	Minimum	Maximum
Summer	west	6.153×10^8	1.508×10^7	4.105×10^9
	east	3.382×10^8	1.131×10^7	3.140×10^9
Winter	west	2.291×10^9	2.017×10^8	2.743×10^{10}
	east	1.778×10^9	3.140×10^7	1.120×10^{10}

WAVE POWER

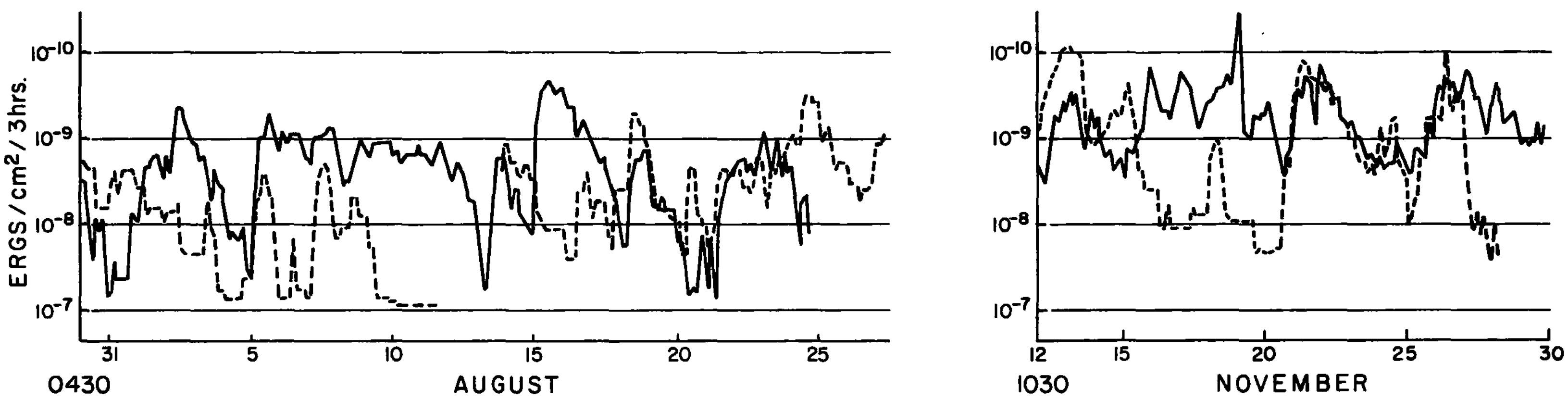


Figure 3.1 Plot of the log values of wave power (west - solid line; east - dashed line).

SUMMER

WEST

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
30	0	2.0	30	21	3.053E 08
30	300	2.0	30	21	3.053E 08
30	600	2.0	20	14	1.357E 08
30	900	1.5	10	7	4.523E 07
30	1200	2.5	20	14	1.086E 08
30	1500	3.0	20	14	9.046E 07
30	1800	2.5	20	14	1.086E 08
30	2100	4.0	10	7	1.696E 07
31	0	4.0	10	7	1.696E 07
31	300	2.0	10	7	3.392E 07
31	600	3.0	10	7	2.262E 07
31	900	3.0	10	7	2.262E 07
31	1200	3.0	10	7	2.262E 07
31	1500	3.0	10	7	2.262E 07
31	1800	2.0	20	14	1.357E 08
31	2100	2.5	20	14	1.086E 08
1	0	2.0	20	14	1.357E 08
1	300	2.5	30	21	2.442E 08
1	600	3.5	50	35	4.846E 08
1	900	3.5	50	35	4.846E 08
1	1200	4.0	60	42	6.106E 08
1	1500	4.0	60	42	6.106E 08
1	1800	3.5	50	35	4.846E 08
1	2100	3.5	40	28	3.102E 08
2	0	3.0	50	35	5.654E 08
2	300	3.0	40	28	3.618E 08
2	600	4.0	70	49	8.311E 08
2	900	5.0	130	92	2.293E 09
2	1200	6.0	140	99	2.216E 09
2	1500	6.0	110	78	1.368E 09
2	1800	5.0	90	64	1.099E 09
2	2100	5.0	80	57	8.684E 08
3	0	5.5	80	57	7.895E 08
3	300	5.0	60	42	4.885E 08
3	600	4.0	60	42	6.106E 08
3	900	4.0	40	28	2.714E 08
3	1200	3.0	30	21	2.035E 08
3	1500	4.0	50	35	4.240E 08
3	1800	3.5	40	28	3.102E 08
3	2100	4.0	40	28	2.714E 08
4	0	4.0	30	21	1.527E 08
4	300	4.0	20	14	6.785E 07
4	600	3.5	20	14	7.754E 07
4	900	4.0	20	14	6.785E 07
4	1200	4.0	20	14	6.785E 07
4	1500	3.0	20	14	9.046E 07
4	1800	3.0	10	7	2.262E 07
4	2100	3.0	10	7	2.262E 07
5	0	2.0	20	14	1.357E 08
5	300	2.0	30	21	3.053E 08
5	600	3.0	70	49	1.108E 09
5	900	3.0	70	49	1.108E 09

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
5	1200	3.5	100	71	1.938E 09
5	1500	3.5	90	64	1.570E 09
5	1800	4.0	80	57	1.086E 09
5	2100	5.0	70	49	6.649E 08
6	0	5.0	90	64	1.099E 09
6	300	6.0	90	64	9.159E 08
6	600	7.0	100	71	9.692E 08
6	900	5.0	90	64	1.099E 09
6	1200	4.0	80	57	1.086E 09
6	1500	4.0	80	57	1.086E 09
6	1800	4.0	70	49	8.311E 08
6	2100	4.5	60	42	5.428E 08
7	0	5.0	60	42	4.885E 08
7	300	6.0	90	64	9.159E 08
7	600	5.0	90	64	1.099E 09
7	900	5.0	90	64	1.099E 09
7	1200	5.0	90	64	1.099E 09
7	1500	5.0	100	71	1.357E 09
7	1800	6.0	110	78	1.368E 09
7	2100	6.0	100	71	1.131E 09
8	0	5.0	60	42	4.885E 08
8	300	4.0	40	28	2.714E 08
8	600	3.5	40	28	3.102E 08
8	900	3.5	40	28	3.102E 08
8	1200	3.5	50	35	4.846E 08
8	1500	4.0	60	42	6.106E 08
8	1800	5.0	80	57	8.684E 08
8	2100	5.0	80	57	8.684E 08
9	0	5.0	70	49	6.649E 08
9	300	4.0	60	42	6.106E 08
9	600	5.0	80	57	8.684E 08
9	900	5.0	80	57	8.684E 08
9	1200	5.0	80	57	8.684E 08
9	1500	5.0	80	57	8.684E 08
9	1800	5.0	80	57	8.684E 08
9	2100	5.0	80	57	8.684E 08
10	0	5.5	70	49	6.044E 08
10	300	5.0	70	49	6.649E 08
10	600	4.5	60	42	5.428E 08
10	900	4.0	60	42	6.106E 08
10	1200	4.0	60	42	6.106E 08
10	1500	4.0	60	42	6.106E 08
10	1800	4.0	60	42	6.106E 08
10	2100	4.0	70	49	8.311E 08
11	0	4.0	60	42	6.106E 08
11	300	4.0	60	42	6.106E 08
11	600	3.5	50	35	4.846E 08
11	900	3.5	50	35	4.846E 08
11	1200	3.5	60	42	6.978E 08
11	1500	4.0	70	49	8.311E 08
11	1800	4.0	60	42	6.106E 08
11	2100	4.0	50	35	4.240E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
12	0	3.5	40	28	3.102E 08
12	300	3.5	50	35	4.846E 08
12	600	3.5	50	35	4.846E 08
12	900	4.0	50	35	4.240E 08
12	1200	4.0	40	28	2.714E 08
12	1500	3.5	30	21	1.745E 08
12	1800	3.5	30	21	1.745E 08
12	2100	3.5	30	21	1.745E 08
13	0	4.0	20	14	6.785E 07
13	300	4.0	10	7	1.696E 07
13	600	3.5	10	7	1.938E 07
13	900	2.5	20	14	1.086E 08
13	1200	3.0	30	21	2.035E 08
13	1500	3.0	50	35	5.654E 08
13	1800	3.0	50	35	5.654E 08
13	2100	3.0	50	35	5.654E 08
14	0	2.5	40	28	4.342E 08
14	300	2.0	20	14	1.357E 08
14	600	2.5	30	21	2.442E 08
14	900	2.5	30	21	2.442E 08
14	1200	2.5	20	14	1.086E 08
14	1500	3.0	20	14	9.046E 07
14	1800	3.5	20	14	7.754E 07
14	2100	3.5	20	14	7.754E 07
15	0	3.0	40	28	3.618E 08
15	300	4.0	120	85	2.442E 09
15	600	5.5	160	113	3.158E 09
15	900	8.0	220	156	4.105E 09
15	1200	7.5	210	148	3.989E 09
15	1500	7.5	200	141	3.618E 09
15	1800	7.5	190	134	3.266E 09
15	2100	7.0	190	134	3.499E 09
16	0	6.5	180	127	3.382E 09
16	300	6.0	140	99	2.216E 09
16	600	6.0	140	99	2.216E 09
16	900	5.5	90	64	9.992E 08
16	1200	5.5	100	71	1.234E 09
16	1500	6.5	120	85	1.503E 09
16	1800	6.0	110	78	1.368E 09
16	2100	5.5	90	64	9.992E 08
17	0	5.5	80	57	7.895E 08
17	300	5.0	70	49	6.649E 08
17	600	5.0	60	42	4.885E 08
17	900	4.5	60	42	5.428E 08
17	1200	4.5	50	35	3.769E 08
17	1500	4.0	40	28	2.714E 08
17	1800	3.0	30	21	2.035E 08
17	2100	3.5	30	21	1.745E 08
18	0	5.0	20	14	5.428E 07
18	300	5.0	20	14	5.428E 07
18	600	2.5	30	21	2.442E 08
18	900	3.0	40	28	3.618E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
18	1200	3.0	50	35	5.654E 08
18	1500	3.0	50	35	5.654E 08
18	1800	3.5	60	42	6.978E 08
18	2100	3.5	50	35	4.846E 08
19	0	4.0	30	21	1.527E 08
19	300	4.0	30	21	1.527E 08
19	600	4.5	30	21	1.357E 08
19	900	5.5	40	28	1.974E 08
19	1200	4.5	30	21	1.357E 08
19	1500	4.5	30	21	1.357E 08
19	1800	4.5	30	21	1.357E 08
19	2100	4.5	30	21	1.357E 08
20	0	4.5	20	14	6.031E 07
20	300	4.5	20	14	6.031E 07
20	600	4.5	10	7	1.508E 07
20	900	4.5	10	7	1.508E 07
20	1200	4.0	10	7	1.696E 07
20	1500	4.0	10	7	1.696E 07
20	1800	4.0	20	14	6.785E 07
20	2100	4.0	20	14	6.785E 07
21	0	4.0	10	7	1.696E 07
21	300	4.0	20	14	6.785E 07
21	600	5.0	10	7	1.357E 07
21	900	1.5	10	7	4.523E 07
21	1200	2.5	20	14	1.086E 08
21	1500	2.5	30	21	2.442E 08
21	1800	3.0	40	28	3.618E 08
21	2100	3.0	40	28	3.618E 08
22	0	3.5	50	35	4.846E 08
22	300	.5	60	42	4.885E 09
22	600	4.5	60	42	5.428E 08
22	900	4.5	50	35	3.769E 08
22	1200	5.0	60	42	4.885E 08
22	1500	4.5	50	35	3.769E 08
22	1800	4.0	50	35	4.240E 08
22	2100	4.0	70	49	8.311E 08
23	0	5.0	90	64	1.099E 09
23	300	5.0	70	49	6.649E 08
23	600	4.5	60	42	5.428E 08
23	900	4.0	50	35	4.240E 08
23	1200	4.0	70	49	8.311E 08
23	1500	5.0	50	35	3.392E 08
23	1800	4.0	60	42	6.106E 08
23	2100	4.5	50	35	3.769E 08
24	0	4.0	50	35	4.240E 08
24	300	3.5	30	21	1.745E 08
24	600	5.0	20	14	5.428E 07
24	900	3.5	30	21	1.745E 08
24	1200	3.0	30	21	2.035E 08
24	1500	7.5	30	21	8.141E 07

SUMMER

EAST

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
30	430	4.0	60	42	6.106E 08
30	730	4.0	50	35	4.240E 08
30	1030	4.0	50	35	4.240E 08
30	1330	4.0	50	35	4.240E 08
30	1630	4.0	30	21	1.527E 08
30	1930	4.0	30	21	1.527E 08
30	2230	4.0	30	21	1.527E 08
31	130	4.0	30	21	1.527E 08
31	430	4.0	40	28	2.714E 08
31	730	4.0	50	35	4.240E 08
31	1030	5.0	40	28	2.171E 08
31	1330	4.0	50	35	4.240E 08
31	1630	4.0	50	35	4.240E 08
31	1930	4.0	50	35	4.240E 08
31	2230	4.0	50	35	4.240E 08
1	130	4.0	40	28	2.714E 08
1	430	4.0	40	28	2.714E 08
1	730	4.0	40	28	2.714E 08
1	1030	4.5	30	21	1.357E 08
1	1330	4.0	30	21	1.527E 08
1	1630	4.0	30	21	1.527E 08
1	1930	4.0	30	21	1.527E 08
1	2230	4.0	30	21	1.527E 08
2	130	2.5	20	14	1.086E 08
2	430	2.0	20	14	1.357E 08
2	730	2.0	20	14	1.357E 08
2	1030	2.0	20	14	1.357E 08
2	1330	1.5	20	14	1.809E 08
2	1630	5.0	20	14	5.428E 07
2	1930	6.0	20	14	4.523E 07
2	2230	6.0	20	14	4.523E 07
3	130	6.0	20	14	4.523E 07
3	430	6.0	20	14	4.523E 07
3	730	6.0	20	14	4.523E 07
3	1030	6.0	20	14	4.523E 07
3	1330	1.5	20	14	1.809E 08
3	1630	3.0	20	14	9.046E 07
3	1930	4.0	20	14	6.785E 07
3	2230	4.0	10	7	1.696E 07
4	130	4.0	10	7	1.696E 07
4	430	5.0	10	7	1.357E 07
4	730	5.0	10	7	1.357E 07
4	1030	5.0	10	7	1.357E 07
4	1330	5.0	10	7	1.357E 07
4	1630	5.0	10	7	1.357E 07
4	1930	3.0	10	7	2.262E 07
4	2230	3.0	10	7	2.262E 07
5	130	3.0	10	7	2.262E 07
5	430	2.0	20	14	1.357E 08
5	730	3.0	30	21	2.035E 08
5	1030	3.0	40	28	3.618E 08
5	1330	3.0	40	28	3.618E 08
5	1630	2.5	30	21	2.442E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
5	1930	3.0	30	21	2.035E 08
5	2230	4.0	20	14	6.785E 07
6	130	5.0	10	7	1.357E 07
6	430	5.0	10	7	1.357E 07
6	730	5.0	10	7	1.357E 07
6	1030	5.0	10	7	1.357E 07
6	1330	1.0	10	7	6.785E 07
6	1630	4.0	10	7	1.696E 07
6	1930	4.0	10	7	1.696E 07
6	2230	4.0	10	7	1.696E 07
7	130	5.0	10	7	1.357E 07
7	430	5.0	10	7	1.357E 07
7	730	1.5	10	7	4.523E 07
7	1030	2.0	30	21	3.053E 08
7	1330	2.5	40	28	4.342E 08
7	1630	2.0	40	28	5.428E 08
7	1930	3.0	40	28	3.618E 08
7	2230	3.0	30	21	2.035E 08
8	130	4.0	20	14	6.785E 07
8	430	4.0	20	14	6.785E 07
8	730	3.0	20	14	9.046E 07
8	1030	3.0	20	14	9.046E 07
8	1330	3.0	20	14	9.046E 07
8	1630	3.0	30	21	2.035E 08
8	1930	3.0	30	21	2.035E 08
8	2230	4.5	30	21	1.357E 08
9	130	5.0	30	21	1.221E 08
9	430	5.0	30	21	1.221E 08
9	730	5.0	20	14	5.428E 07
9	1030	5.0	20	14	5.428E 07
9	1330	5.0	10	7	1.357E 07
9	1630	5.0	10	7	1.357E 07
9	1930	5.0	10	7	1.357E 07
9	2230	5.0	10	7	1.357E 07
10	130	5.5	10	7	1.234E 07
10	430	5.5	10	7	1.234E 07
10	730	6.0	10	7	1.131E 07
10	1030	6.0	10	7	1.131E 07
10	1330	6.0	10	7	1.131E 07
10	1630	6.0	10	7	1.131E 07
10	1930	6.0	10	7	1.131E 07
10	2230	6.0	10	7	1.131E 07
11	130	6.0	10	7	1.131E 07
11	430	6.0	10	7	1.131E 07
11	730	6.0	10	7	1.131E 07
11	1030	6.0	10	7	1.131E 07
11	1330	6.0	10	7	1.131E 07
12	1330	4.5	60	42	5.428E 08
13	1630	5.0	50	35	3.392E 08
13	1930	4.0	50	35	4.240E 08
13	2230	4.0	70	49	8.311E 08
14	130	4.0	70	49	8.311E 08
14	430	4.5	60	42	5.428E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
14	730	4.5	60	42	5.428E 08
14	1030	4.5	50	35	3.769E 08
14	1330	5.0	50	35	3.392E 08
14	1630	5.0	60	42	4.885E 08
14	1930	5.0	60	42	4.885E 08
14	2230	5.0	50	35	3.392E 08
15	130	5.0	50	35	3.392E 08
15	430	5.0	30	21	1.221E 08
15	730	6.0	30	21	1.018E 08
15	1030	7.0	30	21	8.723E 07
15	1330	7.0	30	21	8.723E 07
15	1630	7.0	30	21	8.723E 07
15	1930	7.0	30	21	8.723E 07
15	2230	7.0	30	21	8.723E 07
16	130	7.0	30	21	8.723E 07
16	430	7.0	20	14	3.877E 07
16	730	7.0	20	14	3.877E 07
16	1030	7.0	20	14	3.877E 07
16	1330	2.5	30	21	2.442E 08
16	1630	2.5	30	21	2.442E 08
16	1930	2.5	40	28	4.342E 08
16	2230	2.5	30	21	2.442E 08
17	130	5.5	30	21	1.110E 08
17	430	6.0	40	28	1.809E 08
17	730	6.0	40	28	1.809E 08
17	1030	6.0	40	28	1.809E 08
17	1330	6.0	30	21	1.018E 08
17	1630	6.0	20	14	4.523E 07
17	1930	2.5	30	21	2.442E 08
17	2230	2.5	30	21	2.442E 08
18	130	2.5	30	21	2.442E 08
18	430	2.5	30	21	2.442E 08
18	730	3.5	60	42	6.978E 08
18	1030	5.0	120	85	1.954E 09
18	1330	5.0	120	85	1.954E 09
18	1630	5.0	100	71	1.357E 09
18	1930	5.0	100	71	1.357E 09
18	2230	5.0	70	49	6.649E 08
19	130	5.0	60	42	4.885E 08
19	430	4.0	40	28	2.714E 08
19	730	4.0	30	21	1.527E 08
19	1030	4.0	30	21	1.527E 08
19	1330	4.0	30	21	1.527E 08
19	1630	5.0	30	21	1.221E 08
19	1930	5.5	30	21	1.110E 08
19	2230	5.5	30	21	1.110E 08
20	130	5.5	30	21	1.110E 08
20	430	6.0	20	14	4.523E 07
20	730	6.0	20	14	4.523E 07
20	1030	2.5	40	28	4.342E 08
20	1330	2.5	40	28	4.342E 08
20	1630	3.5	30	21	1.745E 08
20	1930	5.0	30	21	1.221E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
20	2230	6.5	30	21	9.394E 07
21	130	6.5	30	21	9.394E 07
21	430	6.5	20	14	4.175E 07
21	730	7.0	30	21	8.723E 07
21	1030	2.0	30	21	3.053E 08
21	1330	2.5	40	28	4.342E 08
21	1630	2.5	40	28	4.342E 08
21	1930	3.0	40	28	3.618E 08
21	2230	3.0	40	28	3.618E 08
22	130	4.0	50	35	4.240E 08
22	430	4.0	50	35	4.240E 08
22	730	4.0	40	28	2.714E 08
22	1030	4.0	40	28	2.714E 08
22	1330	5.0	40	28	2.171E 08
22	1630	4.0	40	28	2.714E 08
22	1930	3.0	50	35	5.654E 08
22	2230	3.0	50	35	5.654E 08
23	130	2.5	40	28	4.342E 08
23	430	4.0	30	21	1.527E 08
23	730	2.5	40	28	4.342E 08
23	1030	3.0	40	28	3.618E 08
23	1330	3.0	50	35	5.654E 08
23	1630	3.0	50	35	5.654E 08
23	1930	3.5	60	42	6.978E 08
23	2230	3.5	70	49	9.498E 08
24	130	4.0	80	57	1.086E 09
24	430	4.0	70	49	8.311E 08
24	730	4.0	70	49	8.311E 08
24	1030	6.0	150	106	2.544E 09
24	1330	7.0	180	127	3.140E 09
24	1630	6.5	170	120	3.017E 09
24	1930	6.5	160	113	2.672E 09
24	2230	6.0	150	106	2.544E 09
25	130	7.5	100	71	9.046E 08
25	430	7.5	100	71	9.046E 08
25	730	7.5	120	85	1.303E 09
25	1030	7.5	100	71	9.046E 08
25	1330	7.5	70	49	4.433E 08
25	1630	5.0	60	42	4.885E 08
25	1930	5.0	60	42	4.885E 08
25	2230	5.0	60	42	4.885E 08
26	130	5.5	50	35	3.084E 08
26	430	5.5	50	35	3.084E 08
26	730	6.0	50	35	2.827E 08
26	1030	6.0	40	28	1.809E 08
26	1330	4.5	40	28	2.412E 08
26	1630	4.5	40	28	2.412E 08
26	1930	4.0	40	28	2.714E 08
26	2230	2.5	40	28	4.342E 08
27	130	4.0	70	49	8.311E 08
27	430	4.0	70	49	8.311E 08
27	730	4.0	80	57	1.086E 09

WINTER

WEST

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
12	1201	4.4	49	34	3.665E 08
12	1501	8.0	49	34	2.015E 08
12	1801	4.9	49	34	3.291E 08
12	2101	5.2	58	41	4.392E 08
13	1	5.7	67	48	5.390E 08
13	301	5.0	114	80	1.752E 09
13	601	7.1	114	80	1.234E 09
13	901	6.1	151	107	2.527E 09
13	1201	5.1	123	87	2.010E 09
13	1501	7.0	188	133	3.418E 09
13	1801	12.1	206	146	2.387E 09
13	2101	6.4	179	126	3.379E 09
14	1	6.2	141	100	2.189E 09
14	301	4.5	67	48	6.827E 08
14	601	4.3	86	61	1.162E 09
14	901	4.3	114	80	2.038E 09
14	1201	5.8	104	74	1.274E 09
14	1501	5.4	114	80	1.623E 09
14	1801	4.4	67	48	6.982E 08
14	2101	4.8	67	48	6.400E 08
15	1	4.2	67	48	7.314E 08
15	301	3.9	49	34	4.134E 08
15	601	3.5	49	34	4.607E 08
15	901	2.9	49	34	5.560E 08
15	1201	3.1	39	28	3.411E 08
15	1501	3.2	58	41	7.137E 08
15	1801	3.4	58	41	6.717E 08
15	2101	3.6	67	48	8.533E 08
16	1	4.2	67	48	7.314E 08
16	301	4.8	86	61	1.041E 09
16	601	4.6	95	67	1.334E 09
16	901	5.6	188	133	4.273E 09
16	1201	6.3	253	179	6.876E 09
16	1501	6.4	206	146	4.513E 09
16	1801	6.1	160	113	2.847E 09
16	2101	4.3	114	80	2.038E 09
17	1	4.4	114	80	1.991E 09
17	301	3.5	95	67	1.753E 09
17	601	5.5	141	100	2.468E 09
17	901	5.6	160	113	3.101E 09
17	1201	5.1	206	146	5.664E 09
17	1501	5.5	206	146	5.252E 09
17	1801	6.0	206	146	4.814E 09
17	2101	5.1	160	113	3.405E 09
18	1	5.3	114	80	1.653E 09
18	301	4.0	86	61	1.250E 09
18	601	4.3	95	67	1.427E 09
18	901	2.9	95	67	2.191E 09
18	1201	4.7	132	93	2.522E 09
18	1501	4.4	132	93	2.694E 09

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
18	1801	5.0	160	113	3.473E 09
18	2101	5.9	179	126	3.665E 09
19	1	4.7	179	126	4.601E 09
19	301	4.1	179	126	5.274E 09
19	601	4.3	169	120	4.520E 09
19	901	6.5	206	146	4.444E 09
19	1201	6.8	392	277	1.531E 10
19	1501	3.8	392	277	2.740E 10
19	1801	4.4	86	61	1.136E 09
19	2101	4.9	86	61	1.020E 09
20	1	5.3	86	61	9.430E 08
20	301	3.8	95	67	1.615E 09
20	601	4.0	95	67	1.534E 09
20	901	3.5	95	67	1.753E 09
20	1201	4.2	104	74	1.760E 09
20	1501	3.5	114	80	2.503E 09
20	1801	4.3	114	80	2.038E 09
20	2101	4.4	95	67	1.395E 09
21	1	3.8	58	41	6.010E 08
21	301	4.5	49	34	3.583E 08
21	601	3.7	58	41	6.173E 08
21	901	4.1	67	48	7.493E 08
21	1201	4.6	95	67	1.334E 09
21	1501	5.0	160	113	3.473E 09
21	1801	6.3	160	113	2.757E 09
21	2101	5.7	206	146	5.068E 09
22	1	6.2	206	146	4.659E 09
22	301	6.9	160	113	2.517E 09
22	601	6.3	114	80	1.391E 09
22	901	4.4	206	146	6.565E 09
22	1201	4.3	169	120	4.520E 09
22	1501	4.3	160	113	4.039E 09
22	1801	4.7	160	113	3.695E 09
22	2101	7.1	160	113	2.446E 09
23	1	6.3	160	113	2.757E 09
23	301	5.5	114	80	1.593E 09
23	601	5.7	114	80	1.537E 09
23	901	4.9	86	61	1.041E 09
23	1201	5.3	104	74	1.394E 09
23	1501	5.2	86	61	9.612E 08
23	1801	5.5	86	61	9.087E 08
23	2101	5.2	77	54	7.648E 08
24	1	5.6	67	48	5.486E 08
24	301	5.0	67	48	6.144E 08
24	601	5.1	58	41	4.478E 08
24	901	5.1	58	41	4.478E 08
24	1201	5.5	67	48	5.585E 08
24	1501	5.4	58	41	4.229E 08
24	1801	4.8	58	41	4.758E 08
24	2101	4.7	58	41	4.859E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
25	1	4.6	58	41	4.965E 08
25	301	3.9	67	48	7.877E 08
25	601	4.7	67	48	6.536E 08
25	901	3.7	49	34	4.358E 08
25	1201	4.2	49	34	3.839E 08
25	1501	4.3	49	34	3.750E 08
25	1801	4.4	67	48	6.982E 08
25	2101	5.5	77	54	7.230E 08
26	1	5.7	77	54	6.977E 08
26	301	5.6	77	54	7.101E 08
26	601	5.6	104	74	1.320E 09
26	901	7.6	104	74	9.724E 08
26	1201	4.7	160	113	3.695E 09
26	1501	7.2	188	133	3.323E 09
26	1801	5.9	206	146	4.896E 09
26	2101	6.6	188	133	3.626E 09
27	1	5.5	179	126	3.932E 09
27	301	5.8	160	113	2.994E 09
27	601	6.4	160	113	2.713E 09
27	901	6.8	197	139	3.875E 09
27	1201	5.3	206	146	5.450E 09
27	1501	4.2	188	133	5.697E 09
27	1801	5.5	160	113	3.158E 09
27	2101	6.7	160	113	2.592E 09
28	1	6.1	160	113	2.847E 09
28	301	5.3	114	80	1.653E 09
28	601	5.5	95	67	1.116E 09
28	901	4.4	114	80	1.991E 09
28	1201	5.6	160	113	3.101E 09
28	1501	4.2	160	113	4.135E 09
28	1801	5.9	151	107	2.612E 09
28	2101	5.7	114	80	1.537E 09
29	1	5.4	114	80	1.623E 09
29	301	4.8	114	80	1.825E 09
29	601	4.6	114	80	1.905E 09
29	901	3.7	95	67	1.658E 09
29	1201	5.8	86	61	8.617E 08
29	1501	5.4	86	61	9.256E 08
29	1801	6.2	86	61	8.061E 08
29	2101	5.9	86	61	8.471E 08
30	1	5.7	86	61	8.769E 08
30	301	6.6	114	80	1.328E 09
30	601	4.8	77	54	8.285E 08
30	901	4.0	86	61	1.250E 09

WINTER

EAST

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
12	1031	4.0	70	49	8.311E 08
12	1331	4.5	120	85	2.171E 09
12	1631	5.0	150	106	3.053E 09
12	1931	5.0	180	127	4.396E 09
12	2231	5.0	200	141	5.428E 09
13	131	6.5	250	177	6.524E 09
13	431	7.0	310	219	9.314E 09
13	731	7.0	330	233	1.055E 10
13	1031	7.0	340	240	1.120E 10
13	1331	8.0	350	247	1.039E 10
13	1631	8.5	350	247	9.778E 09
13	1931	8.5	350	247	9.778E 09
13	2231	8.5	300	212	7.184E 09
14	131	8.0	170	120	2.451E 09
14	431	10.0	120	85	9.770E 08
14	731	10.0	110	78	8.209E 08
14	1031	10.0	110	78	8.209E 08
14	1331	8.0	110	78	1.026E 09
14	1631	8.0	110	78	1.026E 09
14	1931	6.0	100	71	1.131E 09
14	2231	6.0	110	78	1.368E 09
15	131	4.0	110	78	2.052E 09
15	431	4.0	100	71	1.696E 09
15	731	4.0	100	71	1.696E 09
15	1031	5.0	140	99	2.660E 09
15	1331	4.5	170	120	4.357E 09
15	1631	4.5	120	85	2.171E 09
15	1931	4.5	100	71	1.508E 09
15	2231	5.5	60	42	4.441E 08
16	131	6.0	60	42	4.071E 08
16	431	7.0	50	35	2.423E 08
16	731	7.0	50	35	2.423E 08
16	1031	7.0	50	35	2.423E 08
16	1331	7.0	50	35	2.423E 08
16	1631	7.0	30	21	8.723E 07
16	1931	7.0	30	21	8.723E 07
16	2231	7.0	40	28	1.551E 08
17	131	7.0	30	21	8.723E 07
17	431	7.0	30	21	8.723E 07
17	731	7.0	30	21	8.723E 07
17	1031	7.0	30	21	8.723E 07
17	1331	7.0	30	21	8.723E 07
17	1631	7.0	30	21	8.723E 07
17	1931	4.0	30	21	1.527E 08
17	2231	5.0	30	21	1.221E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
18	131	5.0	30	21	1.221E 08
18	431	5.0	30	21	1.221E 08
18	731	5.0	30	21	1.221E 08
18	1031	2.0	40	28	5.428E 08
18	1331	2.5	50	35	6.785E 08
18	1631	2.5	60	42	9.770E 08
18	1931	2.5	50	35	6.785E 08
18	2231	5.0	40	28	2.171E 08
19	131	5.5	30	21	1.110E 08
19	431	6.0	30	21	1.018E 08
19	731	6.0	30	21	1.018E 08
19	1031	6.0	30	21	1.018E 08
19	1331	6.0	30	21	1.018E 08
19	1631	6.0	30	21	1.018E 08
19	1931	6.0	30	21	1.018E 08
19	2231	6.0	30	21	1.018E 08
20	131	6.0	20	14	4.523E 07
20	431	5.5	20	14	4.934E 07
20	731	6.0	20	14	4.523E 07
20	1031	6.0	20	14	4.523E 07
20	1331	6.0	20	14	4.523E 07
20	1631	5.5	20	14	4.934E 07
20	1931	5.5	20	14	4.934E 07
20	2231	5.5	20	14	4.934E 07
21	131	2.0	30	21	3.053E 08
21	431	2.5	40	28	4.342E 08
21	731	3.0	70	49	1.108E 09
21	1031	5.0	140	99	2.660E 09
21	1331	5.5	210	148	5.440E 09
21	1631	6.0	260	184	7.644E 09
21	1931	9.0	300	212	6.785E 09
21	2231	9.0	260	184	5.096E 09
22	131	9.0	250	177	4.712E 09
22	431	9.0	240	170	4.342E 09
22	731	7.0	210	148	4.274E 09
22	1031	7.0	180	127	3.140E 09
22	1331	5.5	180	127	3.997E 09
22	1631	5.5	140	99	2.418E 09
22	1931	5.5	140	99	2.418E 09
22	2231	5.0	140	99	2.660E 09
23	131	5.5	110	78	1.493E 09
23	431	5.0	100	71	1.357E 09
23	731	7.0	100	71	9.692E 08
23	1031	7.0	100	71	9.692E 08
23	1331	7.0	80	57	6.203E 08

DAY	TIME	PERIOD (SEC.)	SIG. HEIGHT (CM.)	RMS HEIGHT (CM.)	ENERGY ERGS/CM/3HR.
23	1631	6.5	70	49	5.115E 08
23	1931	6.5	70	49	5.115E 08
23	2231	6.5	60	42	3.758E 08
24	131	7.0	70	49	4.749E 08
24	431	7.0	60	42	3.489E 08
24	731	5.5	70	49	6.044E 08
24	1031	3.5	80	57	1.241E 09
24	1331	4.5	60	42	5.428E 08
24	1631	5.0	80	57	8.684E 08
24	1931	4.5	100	71	1.508E 09
24	2231	5.0	110	78	1.642E 09
25	131	4.5	60	42	5.428E 08
25	431	5.5	60	42	4.441E 08
25	731	5.0	50	35	3.392E 08
25	1031	6.5	30	21	9.394E 07
25	1331	5.0	30	21	1.221E 08
25	1631	5.5	40	28	1.974E 08
25	1931	4.5	60	42	5.428E 08
25	2231	4.5	60	42	5.428E 08
26	131	4.5	100	71	1.508E 09
26	431	4.5	100	71	1.508E 09
26	731	4.5	100	71	1.508E 09
26	1031	5.0	110	78	1.642E 09
26	1331	4.5	100	71	1.508E 09
26	1631	1.0	120	85	9.770E 09
26	1931	6.0	180	127	3.664E 09
26	2231	6.0	130	92	1.911E 09
27	131	5.5	160	113	3.158E 09
27	431	5.5	150	106	2.776E 09
27	731	5.5	140	99	2.418E 09
27	1031	5.5	70	49	6.044E 08
27	1331	7.0	50	35	2.423E 08
27	1631	7.5	30	21	8.141E 07
27	1931	7.5	40	28	1.447E 08
27	2231	8.0	30	21	7.633E 07
28	131	9.0	40	28	1.206E 08
28	431	9.5	30	21	6.427E 07
28	731	8.0	20	14	3.392E 07
28	1031	6.5	30	21	9.394E 07
28	1331	7.0	20	14	3.877E 07

PART 4

COMPUTED LONGSHORE SEDIMENT TRANSPORT RATES

CONTENTS

Derivation of Values:

Rates of longshore sediment transport were computed from the longshore component of wave energy flux per unit length of beach (Ea) by:

$$Ea = \frac{\rho g^{3/2}}{8} d_b^{\frac{1}{2}} H_b{}^2 \sin \alpha \cos \alpha \tag{4}$$

d_b is the breaker depth and α is the breaker angle. Substituting $1.28H_b$ for d_b (Munk, 1949):

$$Ea = \sqrt{1.28}\, \rho g^{3/2}\, H_b{}^{5/2} \sin \alpha \cos \alpha \tag{5}$$

An empirical relationship between the longshore energy component and transport rates derived from Inman and Bagnold (1963) is given by Das (1971):

$$I = kEa \tag{6}$$

where I is the immersed weight of longshore transport and k is an empirical constant taken as 0.35. The immersed-weight transport rate is related to the volume transport rate (Q) by:

$$Q = \frac{I}{g(ps-pf)\ (1-p)} \tag{7}$$

where ps is the sediment density, pf is the fluid density ($=\rho$) and p is the sediment porosity taken as 0.4.

Values for Q were computed for each pair of H_b and α. From (7), these rates were converted to a volume over a three-hour period (Q_3) using:

$$Q_3 = \frac{Q\ 10800\ m^3}{T} \tag{8}$$

where T is the wave period.

Data Format:

The tables of data are presented as computer print-outs in the following format:

1. Date
2. Time
3. Breaker distance (m x 10)
4. Breaker height (cm)
5. Breaker angle
6. Wave energy per meter length of beach, from equation (5)
7. Immersed sediment weight, from equation (6)
8. Volume transport rate (m^3), from equation (7)
9. Wave period (seconds)
10. Volume transport (m^3/3 hours), from equation (8). On the west site negative values are transport to the north, positive values are transport to the south; on the east site, negative values refer to southerly transport and positive values to northerly transport.

A summary of the reduced data is given in Table 4.1 and plots of the rates are given in Figures 4.1 to 4.2.

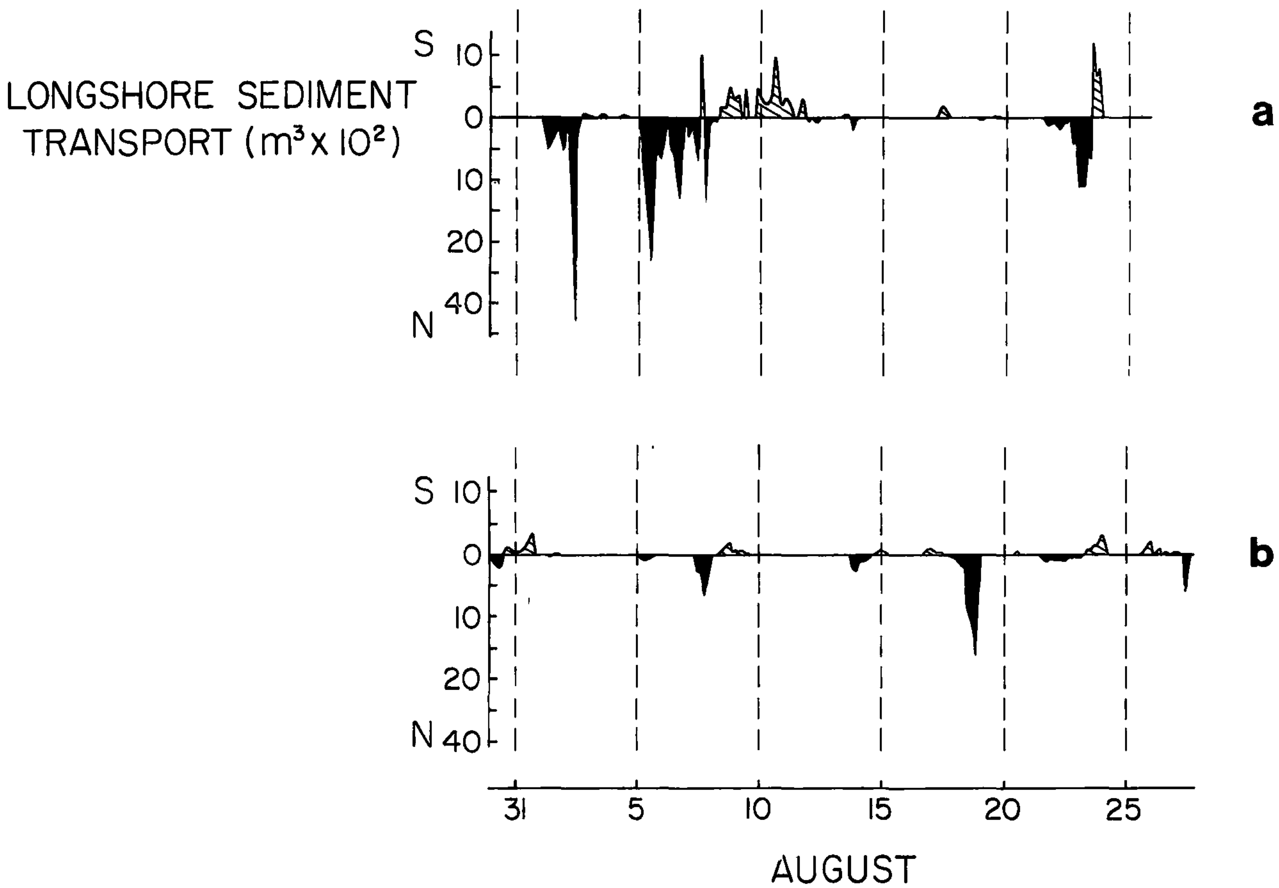


Figure 4.1 Plots of computed rates of longshore sediment transport for the summer phase (a: west, b: east)

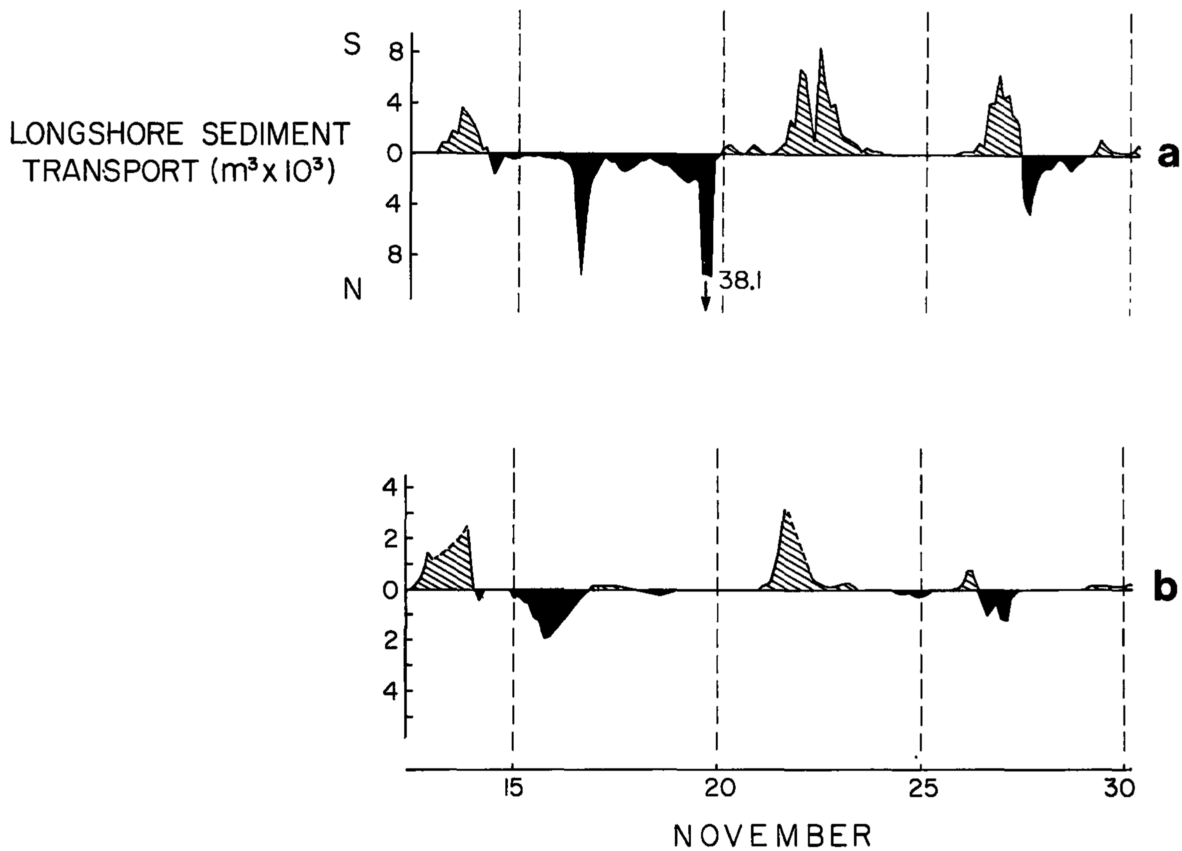


Figure 4.2 Plots of computed rates of longshore sediment transport for the winter phase (a: west, b: east) Note the scale change from Fig 4.1

TABLE 4.1

Summary of computed longshore sediment transport rates

a. Summer longshore sediment transport:

		Total Transport (m^3)	Period (hours)	Hourly Rate (m^3/hour)	Net Daily Rate (m^3/day)
East	to North	11 149	219	51	195.36
	to South	5 626	150	38	-
West	to North	34 903	240	145	415.14
	to South	12 904	141	92	-

b. Winter longshore sediment transport:

East	to North	21 569	84	257	-
	to South	38 501	126	306	933.84
West	to North	117 708	192	613	1 244.16
	to South	112 034	222	504	-

c. Approximate annual (ice-free period) sediment transport rates:

East: gross transport: 534 896 m^3/year

net transport: 101 080 m^3/year to the south

West: gross transport: 1 999 058 m^3/year

net transport: 227 117 m^3/year to the north

SUMMER

WEST

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
30	0	0	0	150	0	0	0	2.000E 00	0
30	300	0	0	150	0	0	0	2.000E 00	0
30	600	0	0	145	0	0	0	2.000E 00	0
30	900	0	0	160	0	0	0	1.500E 00	0
30	1200	0	0	170	0	0	0	2.500E 00	0
30	1500	0	0	160	0	0	0	3.000E 00	0
30	1800	0	0	155	0	0	0	2.500E 00	0
30	2100	0	0	0	0	0	0	4.000E 00	0
31	0	0	0	0	0	0	0	4.000E 00	0
31	300	0	0	155	0	0	0	2.000E 00	0
31	600	0	0	150	0	0	0	2.000E 00	0
31	900	0	0	160	0	0	0	3.000E 00	0
31	1200	0	0	170	0	0	0	3.000E 00	0
31	1500	0	0	170	0	0	0	3.000E 00	0
31	1800	0	0	140	0	0	0	2.000E 00	0
31	2100	0	0	150	0	0	0	2.500E 00	0
1		0	0	155	0	0	0	2.000E 00	0
1	300	1	20	160	-2.047E-01	-7.166E-02	-7.495E-03	2.500E 00	-32.37684
1	600	5	50	155	-2.411E 00	-8.439E-01	-8.826E-02	3.500E 00	-272.35974
1	900	5	60	150	-4.300E 00	-1.505E 00	-1.574E-01	3.500E 00	-485.70514
1	1200	6	60	160	-3.191E 00	-1.117E 00	-1.168E-01	4.000E 00	-315.44062
1	1500	6	60	160	-3.191E 00	-1.117E 00	-1.168E-01	4.000E 00	-315.44062
1	1800	2	30	160	-5.642E-01	-1.975E-01	-2.065E-02	3.500E 00	-63.72863
1	2100	1	60	160	-3.191E 00	-1.117E 00	-1.168E-01	3.500E 00	-360.50356
2	0	5	60	150	-4.300E 00	-1.505E 00	-1.574E-01	3.000E 00	-566.65599
2	300	4	40	160	-1.158E 00	-4.053E-01	-4.240E-02	3.000E 00	-152.62589
2	600	8	70	160	-4.692E 00	-1.642E 00	-1.718E-01	4.000E 00	-463.75071
2	900	20	160	160	-3.706E 01	-1.297E 01	-1.357E 00	6.000E 00	-2442.01421
2	1200	[illegible]	170	140	-6.607E 01	-2.312E 01	-2.419E 00	6.000E 00	-4353.65985
2	1500	20	90	170	-4.679E 00	-1.638E 00	-1.713E-01	5.000E 00	-370.01552
2	1800	20	80	175	-1.770E 00	-6.194E-01	-6.479E-02	5.000E 00	-139.94493
2	2100	18	60	5	8.622E-01	3.018E-01	3.156E-02	5.000E 00	68.17267
3		18	60	5	8.622E-01	3.018E-01	3.156E-02	5.500E 00	61.97516
3	300	17	60	0	0	0	0	5.000E 00	0
3	600	15	70	0	0	0	0	4.000E 00	0
3	900	5	70	0	0	0	0	4.000E 00	0
3	1200	4	[illegible]	0	0	0	0	3.000E 00	0
3	1500	2	[illegible]	5	8.622E-01	3.018E-01	3.156E-02	4.000E 00	85.21584
3	1800	2	[illegible]	0	0	0	0	3.500E 00	0
3	2100	1	45	0	0	0	0	4.000E 00	0
4	0	1	20	170	-1.089E-01	-3.813E-02	-3.988E-03	4.000E 00	-10.76710
4	300	1	20	170	-1.089E-01	-3.813E-02	-3.988E-03	4.000E 00	-10.76710
4	600	1	20	160	-2.047E-01	-7.166E-02	-7.495E-03	4.000E 00	-20.23553

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
4	900	1	30	10	3.002E-01	1.051E-01	1.099E-02	4.000E 00	29.67063
4	1200	1	30	5	1.524E-01	5.334E-02	5.579E-03	4.000E 00	15.06418
4	1500	1	20	0	0	0	0	3.000E 00	0
4	1800	1	10	170	-1.926E-02	-6.740E-03	-7.050E-04	3.000E 00	-2.53783
4	2100	1	10	0	0	0	0	3.000E 00	0
5	0	1	0	160	0	0	0	2.000E 00	0
5	300	1	30	155	-6.723E-01	-2.353E-01	-2.461E-02	2.000E 00	-132.91044
5	600	15	80	150	-4.300E 00	-1.505E 00	-1.574E-01	3.000E 00	-566.65599
5	900	15	100	155	-1.364E 01	-4.774E 00	-4.993E-01	3.500E 00	-1540.69937
5	1200	17	120	155	-2.152E 01	-7.530E 00	-7.876E-01	3.500E 00	-2430.36230
5	1500	19	90	160	-6.551E 00	-2.293E 00	-2.398E-01	3.500E 00	-740.04206
5	1800	16	80	160	-6.551E 00	-2.293E 00	-2.398E-01	4.000E 00	-647.53680
5	2100	2[illegible]	80	160	-6.551E 00	-2.293E 00	-2.398E-01	5.000E 00	-518.02944
6	0	2[illegible]	100	165	-8.902E 00	-3.116E 00	-3.259E-01	5.000E 00	-703.93407
6	300	15	90	175	-2.376E 00	-8.315E-01	-8.697E-02	6.000E 00	-156.55150
6	600	23	150	0	0	0	0	7.000E 00	0
6	900	25	100	170	-6.090E 00	-2.131E 00	-2.229E-01	5.000E 00	-481.51926
6	1200	22	100	170	-6.090E 00	-2.131E 00	-2.229E-01	4.000E 00	-601.89907
6	1500	25	100	155	-1.364E 01	-4.774E 00	-4.993E-01	4.000E 00	-1348.11195
6	1800	15	90	150	-1.185E 01	-4.147E 00	-4.338E-01	4.000E 00	-1171.14022
6	2100	15	70	170	-2.497E 00	-8.738E-01	-9.139E-02	4.500E 00	-219.33920
7	0	10	50	0	0	0	0	5.000E 00	0
7	300	20	120	175	-4.877E 00	-1.707E 00	-1.785E-01	7.000E 00	-275.45920
7	600	25	70	175	-1.268E 00	-4.436E-01	-4.640E-02	5.000E 00	-100.22529
7	900	25	80	170	-3.486E 00	-1.220E 00	-1.276E-01	5.000E 00	-275.63771
7	1200	27	100	165	-8.902E 00	-3.116E 00	-3.259E-01	5.000E 00	-703.93407
7	1500	15	100	30	1.542E 01	5.397E 00	5.645E-01	6.000E 00	1016.04131
7	1800	26	130	160	-2.205E 01	-7.718E 00	-8.073E-01	6.000E 00	-1453.13716
7	2100	1[illegible]	60	170	-1.695E 00	-5.943E-01	-6.216E-02	6.000E 00	-111.89496
8	0	10	40	165	-9.009E-01	-3.153E-01	-3.298E-02	5.000E 00	-71.23312
8	300	10	40	175	-3.129E-01	-1.095E-01	-1.145E-02	4.000E 00	-30.92375
8	600	1[illegible]	30	150	-7.601E-01	-2.660E-01	-2.783E-02	3.500E 00	-85.86135
8	900	1[illegible]	[illegible]	30	1.560E 00	5.461E-01	5.712E-02	3.500E 00	176.25626
8	1200	20	40	30	1.560E 00	5.461E-01	5.712E-02	4.000E 00	154.22423
8	1500	16	50	30	2.726E 00	9.540E-01	9.978E-02	4.000E 00	269.41864
8	1800	23	70	30	6.321E 00	2.212E 00	2.314E-01	5.000E 00	499.84771
8	2100	20	[illegible]	30	4.300E 00	1.505E 00	1.574E-01	5.000E 00	339.99360
9	0	20	50	30	2.726E 00	9.540E-01	9.978E-02	4.000E 00	269.41864
9	300	17	60	20	3.191E 00	1.117E 00	1.168E-01	3.500E 00	360.50356
9	600	25	130	0	0	0	0	5.000E 00	0
9	900	20	100	10	6.090E 00	2.131E 00	2.229E-01	5.000E 00	481.51926
9	1200	25	90	0	0	0	0	5.000E 00	0
9	1500	25	120	0	0	0	0	5.000E 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
9	1800	20	120	0	0	0	0	5.000E 00	0
9	2100	21	130	5	5.958E 00	2.085E 00	2.181E-01	5.000E 00	471.07558
10		20	120	5	4.877E 00	1.707E 00	1.785E-01	5.500E 00	350.58444
10	300	18	100	5	3.092E 00	1.082E 00	1.132E-01	5.000E 00	244.47374
10	600	20	90	5	2.376E 00	8.315E-01	8.697E-02	4.500E 00	208.73533
10	900	20	100	5	3.092E 00	1.082E 00	1.132E-01	4.000E 00	305.59217
10	1200	16	100	10	6.090E 00	2.131E 00	2.229E-01	4.000E 00	601.89908
10	1500	20	120	10	9.606E 00	3.362E 00	3.517E-01	4.000E 00	949.46026
10	1800	17	80	10	3.486E 00	1.220E 00	1.276E-01	4.000E 00	344.54714
10	2100	15	60	5	1.770E 00	6.194E-01	6.479E-02	4.000E 00	174.93117
11	0	10	100	5	3.092E 00	1.082E 00	1.132E-01	4.000E 00	305.59217
11	300	8	100	5	3.092E 00	1.082E 00	1.132E-01	4.000E 00	305.59217
11	600	5	80	5	1.770E 00	6.194E-01	6.479E-02	3.500E 00	199.92133
11	900	6	60	0	0	0	0	3.500E 00	0
11	1200	5	80	0	0	0	0	3.500E 00	0
11	1500	9	100	5	3.092E 00	1.082E 00	1.132E-01	4.000E 00	305.59217
11	1800	3	100	5	3.092E 00	1.082E 00	1.132E-01	4.000E 00	305.59217
11	2100	3	30	175	-5.466E-01	-1.913E-01	-2.001E-02	4.000E 00	-54.02157
12	0	1	40	170	-6.162E-01	-2.157E-01	-2.256E-02	3.500E 00	-69.60903
12	300	2	40	0	0	0	0	3.500E 00	0
12	600	3	40	170	-6.162E-01	-2.157E-01	-2.256E-02	3.500E 00	-69.60903
12	900	3	40	165	-9.009E-01	-3.153E-01	-3.298E-02	4.000E 00	-89.04140
12	1200	3	30	170	-3.002E-01	-1.051E-01	-1.099E-02	4.000E 00	-29.67063
12	1500	2	30	0	0	0	0	3.500E 00	0
12	1800	1	20	170	-1.089E-01	-3.813E-02	-3.988E-03	3.500E 00	-12.30525
12	2100	1	30	0	0	0	0	3.500E 00	0
13	0	1	30	0	0	0	0	4.000E 00	0
13	300	1	20	0	0	0	0	4.000E 00	0
13	600	1	20	10	1.089E-01	3.813E-02	3.988E-03	3.500E 00	12.30525
13	900	1	20	40	3.137E-01	1.098E-01	1.148E-02	2.500E 00	49.60420
13	1200	2	20	30	2.758E-01	9.654E-02	1.010E-02	3.000E 00	36.35100
13	1500	4	20	140	-3.137E-01	-1.098E-01	-1.148E-02	3.000E 00	-41.33683
13	1800	1	40	145	-1.693E 00	-5.926E-01	-6.198E-02	3.000E 00	-223.12412
13	2100	1	20	150	-2.758E-01	-9.654E-02	-1.010E-02	3.000E 00	-36.35100
14	0	1	10	160	-3.619E-02	-1.267E-02	-1.325E-03	2.500E 00	-5.72347
14	300	1	10	170	-1.926E-02	-6.740E-03	-7.050E-04	2.000E 00	-3.80674
14	600	1	10	165	-2.815E-02	-9.853E-03	-1.031E-03	2.500E 00	-4.45207
14	900	0	10	135	-5.630E-02	-1.971E-02	-2.061E-03	2.500E 00	-8.90414
14	1200	1	10	160	-3.619E-02	-1.267E-02	-1.325E-03	2.500E 00	-5.72347
14	1500	1	10	170	-1.926E-02	-6.740E-03	-7.050E-04	3.000E 00	-2.53783
14	1800	1	10	150	-4.876E-02	-1.707E-02	-1.785E-03	3.500E 00	-5.50801
14	2100	1	10	150	-4.876E-02	-1.707E-02	-1.785E-03	3.500E 00	-5.50801
15	0	2	10	0	0	0	0	3.000E 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
15	300	22	150	0	0	0	0	4.000E 00	0
15	600	24	200	0	0	0	0	5.500E 00	0
15	900	24	200	0	0	0	0	8.000F 00	0
15	1200	24	200	0	0	0	0	7.500E 00	0
15	1500	34	200	5	1.749E 01	6.121E 00	6.403E-01	7.500E 00	921.96819
15	1800	32	200	0	0	0	0	7.500E 00	0
15	2100	33	200	0	0	0	0	7.000E 00	0
16	0	33	190	0	0	0	0	6.500E 00	0
16	300	33	190	0	0	0	0	6.000E 00	0
16	600	32	180	0	0	0	0	6.000E 00	0
16	900	27	180	0	0	0	0	5.500E 00	0
16	1200	27	180	0	0	0	0	5.500E 00	0
16	1500	26	120	0	0	0	0	6.500E 00	0
16	1800	26	150	0	0	0	0	6.000E 00	0
16	2100	26	120	0	0	0	0	5.500F 00	0
17	0	20	110	0	0	0	0	5.500E 00	0
17	300	18	100	0	0	0	0	5.000E 00	0
17	600	16	50	5	1.770E 00	6.194E-01	6.479E-02	5.000E 00	139.94493
17	900	16	90	5	1.770E 00	6.194E-01	6.479E-02	4.500E 00	155.49437
17	1200	10	40	10	6.162E-01	2.157E-01	2.256E-02	4.500E 00	54.14036
17	1500	2	40	0	0	0	0	4.000E 00	0
17	1800	1	20	0	0	0	0	3.000E 00	0
17	2100	1	20	0	0	0	0	3.500E 00	0
18	0	1	20	0	0	0	0	5.000E 00	0
18	300	1	30	0	0	0	0	5.000E 00	0
18	600	1	30	0	0	0	0	2.500E 00	0
18	900	1	20	150	-2.758E-01	-9.654E-02	-1.010E-02	3.000E 00	-36.35100
18	1200	1	20	100	-2.047E-01	-7.166E-02	-7.495E-03	3.000E 00	-26.98070
18	1500	10	100	100	-1.144E 01	-4.006E 00	-4.190E-01	3.000E 00	-1508.26699
18	1800	12	100	100	-1.144E 01	-4.006E 00	-4.190E-01	3.500E 00	-1292.80027
18	2100	3	20	150	-2.758E-01	-9.654E-02	-1.010E-02	3.500E 00	-31.15800
19	0	2	20	150	-2.758E-01	-9.654E-02	-1.010E-02	4.000F 00	-27.26325
19	300	1	30	0	0	0	0	4.000E 00	0
19	600	2	40	0	0	0	0	4.500E 00	0
19	900	3	40	0	0	0	0	5.500E 00	0
19	1200	2	30	10	3.002E-01	1.051E-01	1.099E-02	4.500E 00	26.37390
19	1500	2	20	0	0	0	0	4.500E 00	0
19	1800	2	20	5	5.531E-02	1.936E-02	2.025F-03	4.500E 00	4.85920
19	2100	1	20	0	0	0	0	4.500E 00	0
20	0	1	10	0	0	0	0	4.500E 00	0
20	300	1	10	0	0	0	0	4.500E 00	0
20	600	1	10	0	0	0	0	4.500F 00	0
20	900	1	10	0	0	0	0	4.500F 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
20	1200	1	10	10	1.926E-02	6.740E-03	7.050E-04	4.000E 00	1.90337
20	1500	1	10	5	9.777E-03	3.422E-03	3.579E-04	4.000E 00	.96637
20	1800	1	10	5	9.777E-03	3.422E-03	3.579E-04	4.000E 00	.96637
20	2100	1	10	0	0	0	0	4.000E 00	0
21	0	1	10	0	0	0	0	4.000E 00	0
21	300	1	10	0	0	0	0	4.000E 00	0
21	600	1	10	0	0	0	0	5.000E 00	0
21	900	1	10	0	0	0	0	1.500E 00	0
21	1200	1	20	150	-2.758E-01	-9.654E-02	-1.010E-02	2.500E 00	-43.62120
21	1500	1	30	135	-8.777E-01	-3.072E-01	-3.213E-02	2.500E 00	-138.80180
21	1800	1	30	140	-8.644E-01	-3.025E-01	-3.164E-02	3.000E 00	-113.91091
21	2100	2	30	160	-5.642E-01	-1.975E-01	-2.065E-02	3.000E 00	-74.35007
22	0	3	40	155	-1.380E 00	-4.831E-01	-5.053E-02	3.500E 00	-155.90781
22	300	7	50	160	-2.023E 00	-7.081E-01	-7.406E-02	4.000E 00	-199.96984
22	600	10	50	170	-1.076E 00	-3.766E-01	-3.941E-02	4.500E 00	-94.57931
22	90	10	40	170	-6.162E-01	-2.157E-01	-2.256E-02	4.500E 00	-54.14036
22	1200	12	60	165	-2.482E 00	-8.689E-01	-9.088E-02	5.000E 00	-196.29539
22	1500	10	80	165	-5.096E 00	-1.784E 00	-1.866E-01	4.500E 00	-447.72819
22	1800	10	80	155	-3.803E 00	-1.331E 00	-1.392E-01	4.000E 00	-375.92749
22	2100	8	100	160	-1.144E 01	-4.006E 00	-4.190E-01	4.000E 00	-1131.20024
23	0	10	100	160	-1.144E 01	-4.006E 00	-4.190E-01	4.000E 00	-1131.20024
23	300	10	100	160	-1.144E 01	-4.006E 00	-4.190E-01	4.000E 00	-1131.20024
23	600	11	100	170	-6.090E 00	-2.131E 00	-2.229E-01	4.000E 00	-601.89907
23	900	15	90	165	-6.841E 00	-2.394E 00	-2.504E-01	4.000E 00	-676.15812
23	1200	10	90	30	1.185E 01	4.147E 00	4.338E-01	4.000E 00	1171.14022
23	1500	8	80	25	7.808E 00	2.733E 00	2.858E-01	5.000E 00	617.36345
23	1800	7	80	30	8.827E 00	3.089E 00	3.231E-01	4.500E 00	775.48798
23	2100	1	30	10	3.002E-01	1.051E-01	1.099E-02	4.500E 00	26.37390
24	0	1	30	0	0	0	0	4.500E 00	0
24	300	1	10	0	0	0	0	3.500E 00	0
24	600	1	10	0	0	0	0	5.000E 00	0
24	900	1	10	20	3.619E-02	1.267E-02	1.325E-03	5.500E 00	2.60158
24	1200	1	10	30	4.876E-02	1.707E-02	1.785E-03	6.000E 00	3.21300
24	1500	1	10	15	2.815E-02	9.853E-03	1.031E-03	7.500E 00	1.48402

SUMMER

EAST

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
30	430	3	40	30	1.560E 00	5.461E-01	5.712E-02	3.500E 00	176.25626
30	730	3	50	30	2.726E 00	9.540E-01	9.978E-02	4.000E 00	269.41864
30	1030	3	50	30	2.726E 00	9.540E-01	9.978E-02	4.000E 00	269.41864
30	1330	4	50	0	0	0	0	4.000E 00	0
30	1630	3	40	110	-1.158E 00	-4.053E-01	-4.240E-02	3.000E 00	-152.62589
30	1930	3	50	170	-1.076E 00	-3.766E-01	-3.941E-02	4.000E 00	-106.40173
30	2230	3	40	170	-6.162E-01	-2.157E-01	-2.256E-02	4.000E 00	-60.90790
31	130	4	40	170	-6.162E-01	-2.157E-01	-2.256E-02	4.000E 00	-60.90790
31	430	2	40	175	-3.129E-01	-1.095E-01	-1.145E-02	4.000E 00	-30.92375
31	730	2	50	0	0	0	0	3.000E 00	0
31	1030	2	40	170	-6.162E-01	-2.157E-01	-2.256E-02	4.000E 00	-60.90790
31	1330	3	50	170	-1.698E 00	-5.943E-01	-6.216E-02	4.000E 00	-167.84245
31	1640	3	60	170	-3.466E 00	-1.220E 00	-1.276E-01	4.000E 00	-344.54714
31	1930	4	50	0	0	0	0	4.000E 00	0
31	2230	[illegible]	50	0	0	0	0	4.000E 00	0
1	130	4	40	0	0	0	0	4.000E 00	0
1	430	4	40	0	0	0	0	4.000E 00	0
1	730	3	30	15	4.388E-01	1.536E-01	1.607E-02	4.000E 00	43.37556
1	1030	3	50	0	0	0	0	3.500E 00	0
1	1330	4	40	175	-3.129E-01	-1.095E-01	-1.145E-02	4.000E 00	-30.92375
1	1630	3	40	0	0	0	0	4.000E 00	0
1	1930	1	30	0	0	0	0	4.000E 00	0
1	2230	1	30	0	0	0	0	4.000E 00	0
2	130	1	20	20	2.047E-01	7.166E-02	7.495E-03	2.500E 00	32.37684
2	430	1	20	0	0	0	0	2.000E 00	0
2	730	1	20	0	0	0	0	2.000E 00	0
2	1030	0	20	0	0	0	0	2.000E 00	0
2	1330	1	20	0	0	0	0	1.500E 00	0
2	1630	1	10	0	0	0	0	5.000E 00	0
2	1930	[illegible]	10	0	0	0	0	6.000E 00	0
2	2240	1	10	10	1.926E-02	6.740E-03	7.050E-04	6.000E 00	1.26891
3	130	1	10	5	9.777E-03	3.422E-03	3.579E-04	6.000E 00	.64424
3	430	1	10	5	9.777E-03	3.422E-03	3.579E-04	6.000E 00	.64424
3	730	1	10	5	9.777E-03	3.422E-03	3.579E-04	6.000E 00	.64424
3	1040	1	10	5	9.777E-03	3.422E-03	3.579E-04	6.000E 00	.64424
3	1330	1	10	5	9.777E-03	3.422E-03	3.579E-04	1.500E 00	2.57698
3	1630	1	20	0	0	0	0	3.000E 00	0
3	1930	1	20	0	0	0	0	4.000E 00	0
3	2230	1	20	0	0	0	0	4.000E 00	0
4	130	1	20	0	0	0	0	4.000E 00	0
4	430	1	20	0	0	0	0	5.000E 00	0
4	730	1	20	0	0	0	0	5.000E 00	0
4	1130	1	20	0	0	0	0	5.000E 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
4	1330	1	20	0	0	0	0	5.000E 00	0
4	1630	1	0	5	0	0	0	5.000E 00	0
4	1930	1	0	0	0	0	0	3.000E 00	0
4	2230	1	10	0	0	0	0	3.000E 00	0
5	130	1	10	10	1.926E-02	6.740E-03	7.050E-04	3.000E 00	2.53783
5	430	2	20	30	2.758E-01	9.654E-02	1.010E-02	2.000E 00	54.52650
5	730	3	30	30	7.601E-01	2.660E-01	2.783E-02	3.000E 00	100.17157
5	1030	2	30	20	5.642E-01	1.975E-01	2.065E-02	3.000E 00	74.35007
5	1330	2	30	20	5.642E-01	1.975E-01	2.065E-02	3.000E 00	74.35007
5	1630	1	20	15	1.593E-01	5.574E-02	5.830E-03	2.500E 00	25.18471
5	1930	1	20	20	2.047E-01	7.166E-02	7.495E-03	3.000E 00	26.98070
5	2230	1	10	30	4.876E-02	1.707E-02	1.785E-03	4.000E 00	4.81951
6	130	1	20	0	0	0	0	5.000E 00	0
6	430	1	20	0	0	0	0	5.000E 00	0
6	730	1	10	10	1.926E-02	6.740E-03	7.050E-04	5.000E 00	1.52270
6	1030	1	10	10	1.926E-02	6.740E-03	7.050E-04	5.000E 00	1.52270
6	1330	1	10	5	9.777E-03	3.422E-03	3.579E-04	1.000E 00	3.86547
6	1630	1	30	5	1.524E-01	5.334E-02	5.579E-03	4.000E 00	15.06418
6	1930	1	20	5	5.531E-02	1.936E-02	2.025E-03	4.000E 00	5.46660
6	2230	1	10	0	0	0	0	4.000E 00	0
7	130	0	10	0	0	0	0	5.000E 00	0
7	430	1	30	0	0	0	0	5.000E 00	0
7	730	1	40	5	3.129E-01	1.095E-01	1.145E-02	1.500E 00	82.46334
7	1030	1	40	30	1.560E 00	5.461E-01	5.712E-02	2.000E 00	308.44845
7	1330	2	40	30	1.560E 00	5.461E-01	5.712E-02	2.500E 00	246.75876
7	1630	3	60	23	3.571E 00	1.250E 00	1.307E-01	2.000E 00	706.01545
7	1930	3	60	20	3.191E 00	1.117E 00	1.168E-01	3.000E 00	420.58749
7	2230	1	30	0	0	0	0	3.000E 00	0
8	130	1	20	0	0	0	0	4.000E 00	0
8	430	2	20	0	0	0	0	4.000E 00	0
8	730	1	20	0	0	0	0	3.000E 00	0
8	1030	1	30	160	-5.642E-01	-1.975E-01	-2.065E-02	3.000E 00	-74.35007
8	1330	2	40	160	-1.158E 00	-4.053E-01	-4.240E-02	3.000E 00	-152.62589
8	1630	7	60	170	-1.698E 00	-5.943E-01	-6.216E-02	3.000E 00	-223.78993
8	1930	3	40	175	-3.129E-01	-1.095E-01	-1.145E-02	3.000E 00	-41.23147
8	2230	1	30	150	-7.601E-01	-2.660E-01	-2.783E-02	4.500E 00	-66.78105
9	130	1	30	160	-5.642E-01	-1.975E-01	-2.065E-02	4.500E 00	-49.56671
9	430	1	50	170	-1.076E 00	-3.768E-01	-3.941E-02	5.000E 00	-85.12138
9	730	1	20	170	-1.089E-01	-3.813E-02	-3.988E-03	5.000E 00	-8.61368
9	1030	1	20	170	-1.089E-01	-3.813E-02	-3.988E-03	5.000E 00	-8.61368
9	1330	1	20	0	0	0	0	5.000E 00	0
9	1630	1	20	0	0	0	0	5.000E 00	0
9	1930	1	20	0	0	0	0	5.000E 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
9	2230	1	10	175	-9.777E-03	-3.422E-03	-3.579E-04	5.000E 00	-0.77309
10	13	1	10	0	0	0	0	5.500E 00	0
10	430	1	10	0	0	0	0	5.500E 00	0
10	73	1	10	0	0	0	0	6.000E 00	0
10	1030	1	10	0	0	0	0	6.000E 00	0
10	1330	0	0	0	0	0	0	6.000E 00	0
10	1630	0	0	0	0	0	0	6.000E 00	0
10	1930	1	0	0	0	0	0	6.000E 00	0
10	2230	1	0	0	0	0	0	6.000E 00	0
11	13	0	0	5	0	0	0	6.000E 00	0
11	43	0	0	5	0	0	0	6.000E 00	0
11	730	0	0	5	0	0	0	6.000E 00	0
11	1030	0	0	0	0	0	0	6.000E 00	0
11	133	0	0	0	0	0	0	6.000E 00	0
11	1630	0	0	0	0	0	0	0	21600.00000
11	1930	0	0	0	0	0	0	0	21600.00000
11	2230	0	10	0	0	0	0	0	21600.00000
12	130	0	10	5	9.777E-03	3.422E-03	3.579E-04	0	.00000
12	430	0	10	10	1.926E-02	6.740E-03	7.050E-04	0	.00000
12	730	0	10	5	9.777E-03	3.422E-03	3.579E-04	0	.00000
12	1030	3	10	5	9.777E-03	3.422E-03	3.579E-04	0	.00000
12	1330	0	10	10	1.926E-02	6.740E-03	7.050E-04	4.500E 00	1.69189
12	1630	1	10	5	9.777E-03	3.422E-03	3.579E-04	0	.00000
12	193	1	10	5	9.777E-03	3.422E-03	3.579E-04	0	.00000
12	2230	0	10	0	0	0	0	0	21600.00000
13	130	1	10	0	0	0	0	0	21600.00000
13	430	1	10	5	9.777E-03	3.422E-03	3.579E-04	0	.00000
13	730	1	10	25	4.313E-02	1.510E-02	1.579E-03	0	.00000
13	1030	3	40	0	0	0	0	0	21600.00000
13	1330	5	40	175	-3.129E-01	-1.095E-01	-1.145E-02	0	-0.00000
13	1630	6	50	15	1.574E 00	5.508E-01	5.761E-02	5.000E 00	124.43914
13	1930	7	70	15	3.650E 00	1.277E 00	1.336E-01	4.000E 00	360.73402
13	2230	6	60	5	8.622E-01	3.018E-01	3.156E-02	4.000E 00	85.21584
14	130	6	70	5	1.268E 00	4.436E-01	4.640E-02	4.000E 00	125.28161
14	430	7	70	5	1.268E 00	4.436E-01	4.640E-02	4.500E 00	111.36143
14	730	6	70	5	1.268E 00	4.436E-01	4.640E-02	4.500E 00	111.36143
14	1030	5	60	5	8.622E-01	3.018E-01	3.156E-02	4.500E 00	75.74742
14	1330	5	40	0	0	0	0	5.000E 00	0
14	1630	2	30	0	0	0	0	5.000E 00	0
14	1930	2	70	175	-1.268E 00	-4.436E-01	-4.640E-02	5.000E 00	-100.22529
14	2230	2	40	175	-3.129E-01	-1.095E-01	-1.145E-02	5.000E 00	-24.73900
15	130	2	40	175	-3.129E-01	-1.095E-01	-1.145E-02	5.000E 00	-24.73900
15	430	1	20	175	-5.531E-02	-1.936E-02	-2.025E-03	5.000E 00	-4.37328

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
15	730	1	20	170	-1.089E-01	-3.813E-02	-3.988E-03	6.000E 00	-7.17887
15	1030	1	10	0	0	0	0	7.000E 00	0
15	1330	1	10	0	0	0	0	7.000E 00	0
15	1630	1	30	0	0	0	0	7.000E 00	0
15	1930	1	30	175	-1.524E-01	-5.334E-02	-5.579E-03	7.000E 00	-8.60810
15	2230	1	30	0	0	0	0	7.000E 00	0
16	130	1	20	0	0	0	0	7.000E 00	0
16	430	1	20	0	0	0	0	7.000E 00	0
16	730	1	20	0	0	0	0	7.000F 00	0
16	1030	1	20	0	0	0	0	7.000E 00	0
16	1330	1	30	0	0	0	0	2.500E 00	0
16	1630	1	30	150	-7.601E-01	-2.660E-01	-2.783E-02	2.500E 00	-120.20589
16	1930	1	30	155	-6.723E-01	-2.353E-01	-2.461E-02	2.500E 00	-106.32835
16	2230	1	30	155	-6.723E-01	-2.353E-01	-2.461E-02	2.500E 00	-106.32835
17	130	1	10	160	-3.619E-02	-1.267E-02	-1.325E-03	5.500E 00	-2.60158
17	430	1	40	165	-9.009E-01	-3.153E-01	-3.298E-02	6.000E 00	-59.36093
17	730	1	50	175	-5.466E-01	-1.913E-01	-2.001E-02	6.000E 00	-36.01438
17	1030	1	30	175	-1.524E-01	-5.334E-02	-5.579E-03	6.000E 00	-10.04278
17	1330	1	20	0	0	0	0	6.000E 00	0
17	1630	1	20	15	1.593E-01	5.574E-02	5.830E-03	6.000E 00	10.49363
17	1930	1	20	15	1.593E-01	5.574E-02	5.830E-03	2.500E 00	25.18471
17	2230	1	30	15	4.388E-01	1.536E-01	1.607E-02	2.500E 00	69.40090
18	130	2	40	15	9.009E-01	3.153E-01	3.298E-02	2.500E 00	142.46624
18	430	2	40	15	9.009E-01	3.153E-01	3.298E-02	2.500E 00	142.46624
18	730	4	50	25	2.411E 00	8.439E-01	8.826E-02	3.500E 00	272.35974
18	1030	6	90	25	1.048E 01	3.668E 00	3.837E-01	5.000E 00	828.74748
18	1330	22	100	25	1.364E 01	4.774E 00	4.993E-01	5.000E 00	1078.48956
18	1630	20	120	20	1.805E 01	6.319E 00	6.609E-01	5.000E 00	1427.52128
18	1930	15	130	20	2.205E 01	7.718E 00	8.073E-01	5.000E 00	1743.76460
18	2230	5	40	0	0	0	0	5.000E 00	0
19	130	3	40	0	0	0	0	5.000E 00	0
19	430	3	40	0	0	0	0	4.000E 00	0
19	730	1	20	0	0	0	0	4.000E 00	0
19	1030	1	20	0	0	0	0	4.000E 00	0
19	1330	2	20	0	0	0	0	4.000E 00	0
19	1630	2	20	0	0	0	0	5.000E 00	0
19	1930	1	20	0	0	0	0	5.500E 00	0
19	2230	1	20	0	0	0	0	5.500E 00	0
20	130	1	20	0	0	0	0	5.500E 00	0
20	430	3	20	0	0	0	0	6.000E 00	0
20	730	1	20	0	0	0	0	6.000E 00	0
20	1030	1	40	170	-6.162E-01	-2.157E-01	-2.256E-02	2.500E 00	-97.45265
20	1330	1	30	175	-1.524E-01	-5.334E-02	-5.579E-03	2.500E 00	-24.10268

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
20	1630	2	10	0	0	0	0	3.500E 00	0
20	1930	2	20	0	0	0	0	5.000E 00	0
20	2230	2	20	0	0	0	0	6.500E 00	0
21	130	1	20	0	0	0	0	6.500E 00	0
21	430	2	20	5	5.531E-02	1.936E-02	2.025E-03	6.000E 00	3.64440
21	730	1	20	0	0	0	0	7.000E 00	0
21	1030	1	30	5	1.524E-01	5.334E-02	5.579E-03	2.000E 00	30.12835
21	1330	1	30	30	7.601E-01	2.660E-01	2.783E-02	2.500E 00	120.20589
21	1630	4	30	20	5.642E-01	1.975E-01	2.065E-02	2.500E 00	89.22008
21	1930	1	30	10	3.002E-01	1.051E-01	1.099E-02	3.000E 00	39.56084
21	2230	2	40	10	6.162E-01	2.157E-01	2.256E-02	3.000E 00	81.21054
22	130	4	40	10	6.162E-01	2.157E-01	2.256E-02	4.000E 00	60.90790
22	430	4	40	10	6.162E-01	2.157E-01	2.256E-02	4.000E 00	60.90790
22	730	2	40	20	1.158E 00	4.053E-01	4.240E-02	4.000E 00	114.46942
22	1030	1	30	10	3.002E-01	1.051E-01	1.099E-02	4.000E 00	29.67063
22	1330	1	40	10	6.162E-01	2.157E-01	2.256E-02	5.000E 00	48.72632
22	1630	2	20	10	1.089E-01	3.813E-02	3.988E-03	4.000E 00	10.76710
22	1930	2	30	15	4.388E-01	1.536E-01	1.607E-02	3.000E 00	57.83409
22	2230	1	10	15	2.815E-02	9.853E-03	1.031E-03	3.000E 00	3.71006
23	130	1	20	15	1.593E-01	5.574E-02	5.830E-03	2.500E 00	25.18471
23	430	2	20	5	5.531E-02	1.936E-02	2.025E-03	4.000E 00	5.46660
23	730	1	30	140	-8.644E-01	-3.025E-01	-3.164E-02	2.500E 00	-136.69309
23	1030	1	30	155	-6.723E-01	-2.353E-01	-2.461E-02	3.000E 00	-88.60696
23	1330	1	40	155	-1.380E 00	-4.831E-01	-5.053E-02	3.000E 00	-181.89245
23	1630	3	40	160	-1.158E 00	-4.053E-01	-4.240E-02	3.000E 00	-152.62589
23	1930	4	50	160	-2.023E 00	-7.081E-01	-7.406E-02	3.500E 00	-228.53696
23	2230	7	80	160	-6.551E 00	-2.293E 00	-2.398E-01	3.500E 00	-740.04206
24	130	6	90	170	-4.679E 00	-1.638E 00	-1.713E-01	4.000E 00	-462.51940
24	430	9	90	0	0	0	0	4.000E 00	0
24	730	11	90	0	0	0	0	4.000E 00	0
24	1030	12	200	0	0	0	0	6.000E 00	0
24	1330	20	200	0	0	0	0	7.000E 00	0
24	1630	12	170	0	0	0	0	6.500E 00	0
24	1930	16	160	0	0	0	0	6.500E 00	0
24	2230	16	130	0	0	0	0	6.000E 00	0
25	130	15	120	0	0	0	0	7.500E 00	0
25	430	13	120	0	0	0	0	7.500E 00	0
25	730	15	120	0	0	0	0	7.500E 00	0
25	1030	11	130	0	0	0	0	7.500E 00	0
25	1330	[illegible]	90	0	0	0	0	7.500E 00	0
25	1630	[illegible]	80	170	-3.488E 00	-1.220E 00	-1.276E-01	5.000E 00	-275.63771
25	1930	5	80	160	-6.551E 00	-2.293E 00	-2.398E-01	5.000E 00	-518.02944
25	2230	5	70	0	0	0	0	5.000E 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
26	130	5	40	175	-3.129E-01	-1.095E-01	-1.145E-02	5.500E 00	-22.49000
26	430	4	60	170	-1.698E 00	-5.443E-01	-6.216E-02	5.500E 00	-122.06723
26	730	3	60	175	-8.622E-01	-3.018E-01	-3.156E-02	6.000E 00	-56.81056
26	1030	3	50	175	-5.466E-01	-1.913E-01	-2.001E-02	6.000E 00	-36.01438
26	1330	3	40	175	-3.129E-01	-1.095E-01	-1.145E-02	4.500E 00	-27.48778
26	1630	3	40	0	0	0	0	4.500E 00	0
26	1930	3	40	170	-6.162E-01	-2.157E-01	-2.256E-02	4.000E 00	-60.90790
26	2230	2	40	175	-3.129E-01	-1.095E-01	-1.145E-02	2.500E 00	-49.47801
27	130	3	30	0	0	0	0	4.000E 00	0
27	430	5	40	0	0	0	0	4.000E 00	0
27	730	5	80	20	6.551E 00	2.293E 00	2.398E-01	4.000E 00	647.53680
27	1030	5	80	20	6.551E 00	2.293E 00	2.398E-01	0	.00000
27	1330	7	80	15	5.096E 00	1.784E 00	1.866E-01	0	.00000

WINTER

WEST

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
12	1201	1	30	20	5.642E-01	1.975E-01	2.065E-02	4.400E 00	50.69323
12	1501	1	30	20	5.642E-01	1.975E-01	2.065E-02	8.000E 00	27.88127
12	1801	1	30	20	5.642E-01	1.975E-01	2.065E-02	4.900E 00	45.52045
12	2101	1	40	10	6.162E-01	2.157E-01	2.256E-02	5.200E 00	46.85223
13	1	2	50	10	1.076E 00	3.768E-01	3.941E-02	5.700E 00	74.66788
13	301	15	100	20	1.144E 01	4.006E 00	4.190E-01	5.000E 00	904.96019
13	601	15	100	30	1.542E 01	5.397E 00	5.645E-01	7.100E 00	858.62646
13	901	15	140	20	2.654E 01	9.269E 00	9.716E-01	6.100E 00	1720.24274
13	1201	16	110	30	1.957E 01	6.849E 00	7.163E-01	5.100E 00	1516.96008
13	1501	15	180	60	6.703E 01	2.346E 01	2.454E 00	7.000E 00	3785.69688
13	1801	15	200	45	1.007E 02	3.525E 01	3.687E 00	1.210E 01	3290.95241
13	2101	15	170	20	4.312E 01	1.509E 01	1.579E 00	6.400E 00	2664.04655
14	1	15	130	30	2.971E 01	1.040E 01	1.088E 00	6.200E 00	1894.65136
14	301	15	50	30	2.726E 00	9.540E-01	9.978E-02	4.500E 00	239.48323
14	601	20	70	30	6.321E 00	2.212E 00	2.314E-01	4.300E 00	581.21827
14	901	20	100	140	-1.753E 01	-6.137E 00	-6.419E-01	4.300E 00	-1612.18541
14	1201	18	90	140	-1.347E 01	-4.716E 00	-4.932E-01	5.800E 00	-918.46312
14	1501	18	100	0	0	0	0	5.400E 00	0
14	1801	15	50	150	-2.726E 00	-9.540E-01	-9.978E-02	4.400E 00	-244.92603
14	2101	15	50	150	-2.726E 00	-9.540E-01	-9.978E-02	4.800E 00	-224.51553
15	1	1	50	160	-2.023E 00	-7.081E-01	-7.406E-02	4.200E 00	-190.44747
15	301	1	30	160	-5.642E-01	-1.975E-01	-2.065E-02	3.900E 00	-57.19236
15	601	1	30	150	-7.601E-01	-2.660E-01	-2.783E-02	3.500E 00	-85.86135
15	901	1	30	145	-8.248E-01	-2.887E-01	-3.019E-02	2.900E 00	-112.44054
15	1201	1	20	140	-3.137E-01	-1.098E-01	-1.148E-02	3.100E 00	-40.00338
15	1501	1	40	135	-1.802E 00	-6.306E-01	-6.596E-02	3.200E 00	-222.60350
15	1801	1	40	150	-1.560E 00	-5.461E-01	-5.712E-02	3.400E 00	-181.44027
15	2101	5	50	150	-2.726E 00	-9.540E-01	-9.978E-02	3.600E 00	-299.35404
16	1	7	50	150	-2.726E 00	-9.540E-01	-9.978E-02	4.200E 00	-256.58918
16	301	9	70	150	-6.321E 00	-2.212E 00	-2.314E-01	4.800E 00	-520.67470
16	601	12	80	150	-8.827E 00	-3.089E 00	-3.231E-01	4.600E 00	-758.62954
16	901	38	180	150	-6.703E 01	-2.346E 01	-2.454E 00	5.600E 00	-4732.12110
16	1201	40	250	150	-1.524E 02	-5.333E 01	-5.578E 00	6.300E 00	-9562.51407
16	1501	35	200	150	-8.723E 01	-3.053E 01	-3.193E 00	6.400E 00	-5388.37274
16	1801	35	150	150	-4.249E 01	-1.487E 01	-1.555E 00	6.100E 00	-2753.98092
16	2101	35	100	150	-1.542E 01	-5.397E 00	-5.645E-01	4.300E 00	-1417.73206
17	1	35	100	170	-6.050E 00	-2.131E 00	-2.229E-01	4.400E 00	-547.18098
17	301	30	80	175	-1.770E 00	-6.194E-01	-6.479E-02	3.500E 00	-199.92133
17	601	25	130	175	-5.958E 00	-2.085E 00	-2.181E-01	5.500E 00	-428.25052
17	901	26	150	175	-8.520E 00	-2.982E 00	-3.119E-01	5.600E 00	-601.50928
17	1201	28	200	175	-1.749E 01	-6.121E 00	-6.403E-01	5.100E 00	-1355.83557
17	1501	28	200	175	-1.749E 01	-6.121E 00	-6.403E-01	5.500E 00	-1257.22935
17	1801	28	200	175	-1.749E 01	-6.121E 00	-6.403E-01	6.000E 00	-1152.46024

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
17	2101	20	150	175	-8.520E 00	-2.982E 00	-3.119E-01	5.100E 00	-660.48078
18	1	20	100	170	-6.090E 00	-2.131E 00	-2.229E-01	5.300E 00	-454.26345
18	301	17	70	170	-2.497E 00	-8.738E-01	-9.139E-02	4.000E 00	-246.75660
18	601	15	60	175	-1.770E 00	-6.194E-01	-6.479E-02	4.300E 00	-162.72666
18	901	15	80	170	-3.486E 00	-1.220E 00	-1.276E-01	2.800E 00	-492.21019
18	1201	15	120	170	-9.606E 00	-3.362E 00	-3.517E-01	4.700E 00	-808.05128
18	1501	15	120	170	-9.606E 00	-3.362E 00	-3.517E-01	4.400E 00	-863.14569
18	1801	15	150	170	-1.678E 01	-5.873E 00	-6.143E-01	5.000E 00	-1326.91105
18	2101	20	170	170	-2.295E 01	-8.031E 00	-8.400E-01	5.900E 00	-1537.63749
19	1	20	170	170	-2.295E 01	-8.031E 00	-8.400E-01	4.700E 00	-1930.22578
19	301	20	170	170	-2.295E 01	-8.031E 00	-8.400E-01	4.100E 00	-2212.69785
19	601	28	160	170	-1.972E 01	-6.902E 00	-7.219E-01	4.300E 00	-1813.07249
19	901	28	200	170	-3.445E 01	-1.206E 01	-1.261E 00	6.500E 00	-2095.29559
19	1201	80	400	170	-1.949E 02	-6.820E 01	-7.134E 00	6.800E 00	-11329.86494
19	1501	60	400	160	-3.662E 02	-1.282E 02	-1.341E 01	3.800E 00	-38103.58701
19	1801	25	70	165	-3.650E 00	-1.277E 00	-1.336E-01	4.400E 00	-327.94001
19	2101	25	70	165	-3.650E 00	-1.277E 00	-1.336E-01	4.900E 00	-294.47675
20	1	25	70	30	6.321E 00	2.212E 00	2.314E-01	5.300E 00	471.55445
20	301	25	80	30	8.827E 00	3.089E 00	3.231E-01	3.800E 00	918.34102
20	601	25	60	20	6.551E 00	2.293E 00	2.398E-01	4.000E 00	647.53680
20	901	25	60	5	1.770E 00	6.194E-01	6.479E-02	3.500E 00	199.92133
20	1201	20	90	0	0	0.	0	4.200E 00	0
20	1501	50	100	10	6.090E 00	2.131E 00	2.229E-01	3.500E 00	687.88466
20	1801	20	100	15	8.902E 00	3.116E 00	3.259E-01	4.300E 00	818.52798
20	2101	8	80	15	5.096E 00	1.784E 00	1.866E-01	4.400E 00	457.90383
21	1	4	40	15	9.009E-01	3.153E-01	3.298E-02	3.800E 00	93.72779
21	301	5	30	30	7.601E-01	2.660E-01	2.783E-02	4.500E 00	66.78105
21	601	5	40	30	1.560E 00	5.461E-01	5.712E-02	3.700E 00	166.72889
21	901	3	50	40	3.100E 00	1.085E 00	1.135E-01	4.100E 00	298.89909
21	1201	20	60	40	1.004E 01	3.513E 00	3.674E-01	4.600E 00	862.68169
21	1501	40	150	40	4.832E 01	1.691E 01	1.764E 00	5.000E 00	3820.68810
21	1501	40	150	45	4.906E 01	1.717E 01	1.796E 00	6.300E 00	3079.07014
21	2101	40	200	40	9.919E 01	3.472E 01	3.631E 00	5.700E 00	6879.92297
22	1	40	200	40	9.919E 01	3.472E 01	3.631E 00	6.200E 00	6325.09047
22	301	40	150	40	4.832E 01	1.691E 01	1.769E 00	6.900E 00	2768.61456
22	601	40	100	40	1.753E 01	6.137E 00	6.419E-01	6.300E 00	1100.38052
22	901	40	200	35	9.464E 01	3.313E 01	3.465E 00	4.400E 00	8504.33016
22	1201	32	160	40	5.678E 01	1.987E 01	2.079E 00	4.300E 00	5220.53418
22	1501	28	150	30	4.249E 01	1.487E 01	1.555E 00	4.300E 00	3906.81015
22	1801	25	150	25	3.759E 01	1.315E 01	1.376E 00	4.700E 00	3161.66782
22	2101	20	150	20	3.154E 01	1.104E 01	1.155E 00	7.100E 00	1756.18102
23	1	20	150	15	2.453E 01	8.586E 00	8.981E-01	6.300E 00	1539.53507
23	301	25	100	30	1.542E 01	5.397E 00	5.645E-01	5.500E 00	1108.40870

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
23	601	25	100	30	1.542E 01	5.397E 00	5.645E-01	5.700E 00	1069.51717
23	901	20	70	20	4.692E 00	1.642E 00	1.718E-01	4.800E 00	386.45893
23	1201	18	90	20	8.794E 00	3.078E 00	3.219E-01	5.300E 00	656.03934
23	1501	10	70	25	5.592E 00	1.957E 00	2.047E-01	5.200E 00	425.13583
23	1801	10	70	25	5.592E 00	1.957E 00	2.047E-01	5.500E 00	401.94660
23	2101	10	60	20	3.191E 00	1.117E 00	1.168E-01	5.200E 00	242.64663
24	1	6	50	15	1.574E 00	5.508E-01	5.761E-02	5.600E 00	111.10637
24	301	8	50	0	0	0	0	5.000E 00	0
24	601	1	40	170	-6.162E-01	-2.157E-01	-2.256E-02	5.100E 00	-47.77091
24	901	4	40	160	-1.158E 00	-4.053E-01	-4.240E-02	5.100E 00	-89.77993
24	1201	3	50	160	-2.023E 00	-7.081E-01	-7.406E-02	5.500E 00	-145.43261
24	1501	3	40	160	-1.158E 00	-4.053E-01	-4.240E-02	5.400E 00	-84.79216
24	1801	7	40	155	-1.380E 00	-4.831E-01	-5.053E-02	4.800E 00	-113.68278
24	2101	7	40	155	-1.380E 00	-4.831E-01	-5.053E-02	4.700E 00	-116.10156
25	1	4	40	155	-1.380E 00	-4.831E-01	-5.053E-02	4.600E 00	-118.62551
25	301	0	50	160	-2.023E 00	-7.081E-01	-7.406E-02	3.900E 00	-205.09727
25	601	1	50	160	-2.023E 00	-7.081E-01	-7.406E-02	4.700E 00	-170.18710
25	901	2	30	40	8.644E-01	3.025E-01	3.164E-02	3.700E 00	92.36020
25	1201	1	30	40	8.644E-01	3.025E-01	3.164E-02	4.200E 00	81.36494
25	1501	1	30	30	7.601E-01	2.660E-01	2.783E-02	4.300E 00	69.88714
25	1801	5	50	25	2.411E 00	8.439E-01	8.826E-02	4.400E 00	216.64980
25	2101	6	60	30	4.300E 00	1.505E 00	1.574E-01	5.500E 00	309.08509
26	1	6	60	40	4.890E 00	1.711E 00	1.790E-01	5.700E 00	339.14601
26	301	6	60	30	4.300E 00	1.505E 00	1.574E-01	5.600E 00	303.56571
26	601	9	90	40	1.347E 01	4.716E 00	4.932E-01	5.600E 00	951.26537
26	901	30	90	40	1.347E 01	4.716E 00	4.932E-01	7.600E 00	700.93238
26	1201	25	150	50	4.832E 01	1.691E 01	1.769E 00	4.700E 00	4064.56181
26	1501	28	180	40	7.622E 01	2.668E 01	2.790E 00	7.200E 00	4185.35411
26	1801	25	200	40	9.919E 01	3.472E 01	3.631E 00	5.900E 00	6646.70524
26	2101	25	180	40	7.622E 01	2.668E 01	2.790E 00	6.600E 00	4565.84085
27	1	25	170	40	6.607E 01	2.312E 01	2.419E 00	5.500E 00	4749.44711
27	301	20	150	30	4.249E 01	1.487E 01	1.555E 00	5.800E 00	2896.42821
27	601	20	150	30	4.249E 01	1.487E 01	1.555E 00	6.400E 00	2624.88807
27	901	40	190	160	-5.695E 01	-1.993E 01	-2.085E 00	6.800E 00	-3311.11732
27	1201	40	200	160	-6.474E 01	-2.266E 01	-2.370E 00	5.300E 00	-4829.46029
27	1501	40	180	170	-2.647E 01	-9.265E 00	-9.690E-01	4.200E 00	-2491.81410
27	1801	30	150	170	-1.678E 01	-5.873E 00	-6.143E-01	5.500E 00	-1206.28277
27	2101	30	150	170	-1.678E 01	-5.873E 00	-6.143E-01	6.700E 00	-990.23213
28	1	30	150	170	-1.678E 01	-5.873E 00	-6.143E-01	6.100E 00	-1087.63201
28	301	30	100	170	-6.090E 00	-2.131E 00	-2.229E-01	5.300E 00	-454.26345
28	601	30	80	170	-3.486E 00	-1.220E 00	-1.276E-01	5.500E 00	-250.57973
28	901	25	100	170	-6.090E 00	-2.131E 00	-2.229E-01	4.400E 00	-547.18098
28	1201	30	150	170	-1.678E 01	-5.873E 00	-6.143E-01	5.600E 00	-1184.74201

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
28	1501	30	150	0	0	0	0	4.200E 00	0
28	1801	25	140	175	-7.170E 00	-2.510E 00	-2.625E-01	5.900E 00	-480.47444
28	2101	10	100	0	0	0	0	5.700E 00	0
29	1	10	100	0	0	0	0	5.400E 00	0
29	301	20	100	10	6.090E 00	2.131E 00	2.229E-01	4.800E 00	501.58256
29	601	20	100	25	1.364E 01	4.774E 00	4.993E-01	4.600E 00	1172.27126
29	901	25	80	20	6.551E 00	2.293E 00	2.398E-01	3.700E 00	700.03979
29	1201	20	70	25	5.592E 00	1.957E 00	2.047E-01	5.800E 00	381.15626
29	1501	20	70	20	4.692E 00	1.642E 00	1.718E-01	5.400E 00	343.51905
29	1801	20	70	20	4.692E 00	1.642E 00	1.718E-01	6.200E 00	299.19401
29	2101	20	70	20	4.692E 00	1.642E 00	1.718E-01	5.900E 00	314.40726
30	1	20	70	20	4.692E 00	1.642E 00	1.718E-01	5.700E 00	325.43910
30	301	20	100	30	1.542E 01	5.397E 00	5.645E-01	6.600E 00	923.67392
30	601	20	60	30	4.300E 00	1.505E 00	1.574E-01	4.800E 00	354.16000
30	901	20	70	10	2.497E 00	8.738E-01	9.134E-02	4.000E 00	246.75660

WINTER

EAST

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
12	1031	6	50	150	-2.726E 00	-9.540E-01	-9.978E-02	4.500E 00	-239.48323
12	1331	28	150	175	-8.520E 00	-2.982E 00	-3.119E-01	5.500E 00	-612.44581
12	1631	28	150	170	-1.676E 01	-5.873E 00	-6.143E-01	5.500E 00	-1206.28277
12	1931	28	200	170	-3.445E 01	-1.206E 01	-1.261E 00	4.500E 00	-3026.53808
12	2231	28	200	170	-3.445E 01	-1.206E 01	-1.261E 00	5.800E 00	-2348.17610
13	131	28	200	0	0	0	0	5.600E 00	0
13	431	28	200	0	0	0	0	6.600E 00	0
13	731	34	400	0	0	0	0	6.700E 00	0
13	1031	50	400	0	0	0	0	6.600E 00	0
13	1331	50	400	0	0	0	0	6.900E 00	0
13	1631	70	400	175	-9.894E 01	-3.463E 01	-3.622E 00	8.600E 00	-4548.34855
13	1931	70	300	170	-9.493E 01	-3.322E 01	-3.475E 00	7.300E 00	-5141.19343
13	2231	70	100	170	-6.090E 00	-2.131E 00	-2.229E-01	7.900E 00	-304.75903
14	131	23	100	30	1.542E 01	5.397E 00	5.645E-01	8.000E 00	762.03098
14	431	23	100	0	0	0	0	7.300E 00	0
14	731	23	100	0	0	0	0	8.300E 00	0
14	1031	25	130	0	0	0	0	6.700E 00	0
14	1331	25	130	0	0	0	0	6.200E 00	0
14	1631	25	100	0	0	0	0	3.900E 00	0
14	1931	20	100	0	0	0	0	7.200E 00	0
14	2231	14	100	0	0	0	0	6.200E 00	0
15	131	14	70	20	4.692E 00	1.642E 00	1.716E-01	4.600E 00	403.26149
15	431	14	70	0	0	0	0	4.300E 00	0
15	731	3	100	20	1.144E 01	4.006E 00	4.190E-01	4.100E 00	1103.60999
15	1031	15	130	25	2.628E 01	9.199E 00	9.621E-01	4.900E 00	2120.54870
15	1331	25	150	25	3.759E 01	1.315E 01	1.376E 00	6.200E 00	2396.74819
15	1631	20	160	25	4.417E 01	1.546E 01	1.617E 00	4.600E 00	3796.01635
15	1931	15	100	0	0	0	0	5.000E 00	0
15	2231	15	60	0	0	0	0	4.700E 00	0
16	131	15	50	0	0	0	0	5.000E 00	0
16	431	15	30	0	0	0	0	4.700E 00	0
16	731	10	30	0	0	0	0	3.400E 00	0
16	1031	4	50	0	0	0	0	3.200E 00	0
16	1331	6	50	0	0	0	0	3.800E 00	0
16	1631	9	50	5	5.466E-01	1.913E-01	2.001E-02	2.700E 00	80.03196
16	1931	9	30	0	0	0	0	5.400E 00	0
16	2231	1	30	0	0	0	0	6.400E 00	0
17	131	1	30	0	0	0	0	3.300E 00	0
17	431	1	30	0	0	0	0	2.800E 00	0
17	731	4	50	175	-5.466E-01	-1.913E-01	-2.001E-02	4.200E 00	-51.44912
17	1031	1	30	0	0	0	0	6.900E 00	0
17	1331	1	30	0	0	0	0	5.300E 00	0
17	1631	1	30	0	0	0	0	5.700E 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
17	1931	1	30	175	-1.524E-01	-5.334E-02	-5.579E-03	4.600E 00	-13.09928
17	2231	1	30	175	-1.524E-01	-5.334E-02	-5.579E-03	5.800E 00	-10.38909
18	131	1	30	175	-1.524E-01	-5.334E-02	-5.579E-03	3.900E 00	-15.45044
18	431	1	20	0	0	0	0	2.600E 00	0
18	731	1	20	0	0	0	0	2.600E 00	0
18	1031	1	20	30	2.758E-01	9.654E-02	1.010E-02	2.900E 00	37.60448
18	1331	1	40	15	9.009E-01	3.153E-01	3.298E-02	3.300E 00	107.92897
18	1631	1	30	15	4.388E-01	1.536E-01	1.607E-02	2.200E 00	78.86466
18	1931	1	30	10	3.002E-01	1.051E-01	1.099E-02	4.000E 00	29.67063
18	2231	1	20	10	1.089E-01	3.813E-02	3.988E-03	4.200E 00	10.25438
19	131	1	40	5	3.129E-01	1.095E-01	1.145E-02	4.800E 00	25.76979
19	431	1	40	0	0	0	0	2.600E 00	0
19	731	1	30	0	0	0	0	2.000E 00	0
19	1031	1	30	0	0	0	0	5.700E 00	0
19	1331	1	40	0	0	0	0	7.500E 00	0
19	1631	1	30	0	0	0	0	6.500E 00	0
19	1931	1	30	0	0	0	0	7.700E 00	0
19	2231	1	10	0	0	0	0	8.700E 00	0
20	131	1	30	0	0	0	0	5.100E 00	0
20	431	1	30	0	0	0	0	2.700E 00	0
20	731	1	30	0	0	0	0	2.100E 00	0
20	1031	1	30	0	0	0	0	5.900E 00	0
20	1331	1	20	0	0	0	0	5.500E 00	0
20	1631	1	30	0	0	0	0	4.900E 00	0
20	1931	1	20	0	0	0	0	7.100E 00	0
20	2231	1	20	0	0	0	0	5.500E 00	0
21	131	1	20	150	-2.758E-01	-9.654E-02	-1.010E-02	4.600E 00	-23.70717
21	431	2	30	150	-7.601E-01	-2.660E-01	-2.783E-02	2.600E 00	-115.58259
21	731	5	50	160	-2.023E 00	-7.081E-01	-7.406E-02	3.500E 00	-228.53696
21	1031	28	100	140	-1.753E 01	-6.137E 00	-6.419E-01	4.200E 00	-1650.57078
21	1331	28	150	140	-4.832E 01	-1.691E 01	-1.769E 00	5.700E 00	-3351.48079
21	1631	40	200	140	-9.919E 01	-3.472E 01	-3.631E 00	6.300E 00	-6224.69221
21	1931	30	200	0	0	0	0	7.500E 00	0
21	2231	25	150	0	0	0	0	8.000E 00	0
22	131	25	100	0	0	0	0	7.300E 00	0
22	431	20	100	0	0	0	0	8.200E 00	0
22	731	20	150	170	-1.678E 01	-5.873E 00	-6.143E-01	6.200E 00	-1070.08956
22	1031	20	100	165	-8.902E 00	-3.116E 00	-3.259E-01	6.800E 00	-517.59858
22	1331	20	90	165	-6.841E 00	-2.394E 00	-2.504E-01	6.400E 00	-422.59883
22	1631	20	80	170	-3.486E 00	-1.220E 00	-1.276E-01	6.500E 00	-212.02901
22	1931	20	60	170	-3.486E 00	-1.220E 00	-1.276E-01	7.500E 00	-183.75847
22	2231	20	60	0	0	0	0	7.300E 00	0
23	131	20	80	170	-3.486E 00	-1.220E 00	-1.276E-01	4.700E 00	-293.23160

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
23	431	20	80	160	-6.551E 00	-2.293E 00	-2.398E-01	5.100E 00	-507.87200
23	731	23	80	0	0	0	0	6.000E 00	0
23	1031	20	80	170	-3.486E 00	-1.220E 00	-1.276E-01	6.600E 00	-208.81645
23	1331	10	80	0	0	0	0	6.800E 00	0
23	1631	10	80	0	0	0	0	6.400E 00	0
23	1931	10	60	0	0	0	0	4.400E 00	0
23	2231	8	60	0	0	0	0	4.000E 00	0
24	131	9	50	0	0	0	0	4.200E 00	0
24	431	9	50	0	0	0	0	3.200E 00	0
24	731	9	40	0	0	0	0	6.100E 00	0
24	1031	5	30	5	1.524E-01	5.334E-02	5.579E-03	4.700E 00	12.82057
24	1331	5	30	5	1.524E-01	5.334E-02	5.579E-03	5.500E 00	10.95576
24	1631	4	20	10	1.089E-01	3.813E-02	3.988E-03	6.000E 00	7.17807
24	1931	6	40	10	6.162E-01	2.157E-01	2.256E-02	4.800E 00	50.75659
24	2231	9	60	15	2.482E 00	8.689E-01	9.088E-02	5.300E 00	185.18433
25	131	9	50	15	1.574E 00	5.508E-01	5.761E-02	3.300E 00	188.54415
25	431	9	50	15	1.574E 00	5.508E-01	5.761E-02	4.000E 00	155.54892
25	731	9	40	10	6.162E-01	2.157E-01	2.256E-02	3.200E 00	76.13488
25	1031	3	30	0	0	0	0	7.000E 00	0
25	1331	3	30	0	0	0	0	4.200E 00	0
25	1631	1	20	0	0	0	0	5.200E 00	0
25	1931	4	40	0	0	0	0	4.500E 00	0
25	2231	6	50	0	0	0	0	5.000E 00	0
26	131	8	50	160	-2.023E 00	-7.081E-01	-7.406E-02	2.800E 00	-285.67120
26	431	9	100	155	-1.364E 01	-4.774E 00	-4.993E-01	3.700E 00	-1457.41832
26	731	9	100	150	-1.542E 01	-5.397E 00	-5.645E-01	4.100E 00	-1486.88972
26	1031	12	60	150	-4.300E 00	-1.505E 00	-1.574E-01	4.800E 00	-354.16000
26	1331	12	70	0	0	0	0	4.000E 00	0
26	1631	40	180	10	2.647E 01	9.265E 00	9.690E-01	5.100E 00	2052.08221
26	1931	30	170	10	2.295E 01	8.031E 00	8.400E-01	5.700E 00	1591.58968
26	2231	30	150	10	1.678E 01	5.873E 00	6.143E-01	7.400E 00	896.56152
27	131	34	150	30	4.249E 01	1.487E 01	1.555E 00	7.300E 00	2301.27173
27	431	34	150	30	4.249E 01	1.487E 01	1.555E 00	7.100E 00	2366.09629
27	731	30	100	20	1.144E 01	4.006E 00	4.190E-01	6.600E 00	685.57590
27	1031	6	50	5	5.466E-01	1.913E-01	2.001E-02	5.900E 00	36.62480
27	1331	5	40	0	0	0	0	8.300E 00	0
27	1631	2	30	0	0	0	0	9.700E 00	0
27	1931	2	40	0	0	0	0	5.800E 00	0
27	2231	2	40	0	0	0	0	4.600E 00	0
28	131	3	20	0	0	0	0	3.000E 00	0
28	431	3	40	0	0	0	0	3.200E 00	0
28	731	1	30	0	0	0	0	5.100E 00	0
28	1031	1	10	0	0	0	0	5.500E 00	0

DAY	TIME	BREAKER DIST. (10's of m.)	BREAKER HT. (cm.)	BREAKER ANGLE (deg.)	WAVE ENERGY	IMMERSED WT.	VOL. TRANSPORT (cu. m.)	WAVE PERIOD (sec.)	VOL. TRANSPORT (cu. m./3 hrs)
28	1331	1	10	0	0	0	0	3.400E 00	0
28	1631	1	10	0	0	0	0	4.600E 00	0
28	1931	1	10	0	0	0	0	8.000E 00	0
28	2231	1	20	0	0	0	0	3.900E 00	0
29	131	4	40	160	-1.158E 00	-4.053E-01	-4.240E-02	3.700E 00	-123.75072
29	431	6	30	170	-3.002E-01	-1.051E-01	-1.099E-02	3.600E 00	-32.96737
29	731	1	40	150	-1.560E 00	-5.461E-01	-5.712E-02	3.300E 00	-186.93846
29	1031	1	30	150	-7.601E-01	-2.660E-01	-2.763E-02	6.200E 00	-48.47012
29	1331	6	30	170	-3.002E-01	-1.051E-01	-1.099E-02	4.800E 00	-24.72553
29	1631	6	40	170	-6.162E-01	-2.157E-01	-2.256E-02	5.500E 00	-44.29666
29	1931	9	50	170	-1.076E 00	-3.768E-01	-3.941E-02	4.300E 00	-98.97835
29	2231	5	50	170	-1.076E 00	-3.768E-01	-3.941E-02	5.100E 00	-83.45234
30	131	6	60	160	-3.191E 00	-1.117E 00	-1.168E-01	4.200E 00	-300.41964
30	431	6	70	170	-2.497E 00	-8.738E-01	-9.139E-02	3.000E 00	-329.00880
30	731	6	100	160	-1.144E 01	-4.006E 00	-4.190E-01	4.500E 00	-1005.51132
30	1031	6	80	175	-1.770E 00	-6.194E-01	-6.479E-02	6.400E 00	-109.33198

PART 5

BEACH TOPOGRAPHY

CONTENTS

Morphology and topography maps of the littoral zone are derived from beach profile data surveyed along eleven lines at a 50-m interval on each beach (Fig. 1.1).

Survey Techniques:

A line of semi-permanent metal stakes was set up landward of the foredune ridge to mark the end of each profile line. A set of beach stakes was driven into the beach on the profile lines adjacent to the toe of the foredune ridge. The tops of these stakes were surveyed with a self-levelling Zeiss Ni-2 level to determine relative heights. The dune profiles (between the two stakes on each line) were surveyed once during each phase. The beach profiles start from the beach stakes and were surveyed seawards into water depths up to 1.5 m during the low tide slack periods. Surveys were carried out whenever possible on alternate days using the pole and horizon method (Emery, 1961) (Photo 5.1).

An arbitrary datum of 10.000 m was chosen for the top of the number 11 dune stake at each site. All stake heights were levelled into that datum and it should be noted that no direct relationship exists between the east and west site datum planes.

Data Reduction:

Horizontal and vertical measurements from the beach profiles were transferred to computer cards and elevation changes for each profile were computed and plotted at a vertical exaggeration of X4. Sweep zone profiles (King and Barnes, 1964) were drawn manually from the profile outputs (Fig. 5.1). Using the profile data a computer contoured topographic map for each day of profiles was produced using a general purpose contouring program developed by CALCOMP. Morphologic maps were derived manually from an interpretation of the topographic maps and the profiles.

Data Format:

The contoured topographic maps for each day of profiles were drawn at an interval of 0.25 m and with an offshore exaggeration of X2.5. All heights refer to the arbitrary 10.000 m datum at the crest of the number 11 dune stake on each site. The maps are drawn from the beach profiles which start at the stakes adjacent to the toe of the foredune ridge.

Morphologic maps were prepared with an offshore exaggeration of X3. Each map shows (1) the limits of the beach face slope (solid lines); (2) intertidal and/or nearshore bar(s) (dotted shading); (3) welded ridges (shading) and (4) the length of each profile line (⊥). Slip-faces on the landward margin of asymmetrical bars or scarps cut in the beach face are indicated by cross-hatches. The maps are drawn with reference to the line of beach profile stakes at the base of the foredune ridge.

Profile data are presented as a plot of the calculated vertical and horizontal values drawn at a vertical exaggeration of X4. The dune profiles (suffixed by the letter D) were surveyed once during each phase and are plotted from the base of the dune stake to the base of the beach stake. The beach profiles start from the base of the beach stake. Where the swash line was recorded during profiling this location is marked on the profile plot by a circle. All of the dune stakes remained unmoved throughout the operation but the beach stakes were replaced in November following extensive beach erosion during a major storm in October (Table 5.1).

The plotted profiles are presented in the sequence: summer west, summer east, winter west, winter east and dunes.

Photo 5.1 Beach profiles were surveyed using the pole-and-horizon method. The change in elevation between two vertical staffs is measured by levelling on the horizon. This is a modification of the method described by Emery (1961). The elevation difference between the staffs in this photograph is -9 cm.

TABLE 5.1

Levelled heights to the tops of profile stakes (in metres)

Profile	Dune Stake	Summer Beach Stake	Winter Beach Stake
W1	14.629m	9.052	8.189
W2	14.673	9.896	9.402
W3	14.845	8.222	8.479
W4	14.573	7.740	8.008
W5	9.350	8.004	7.880
W6	9.990	7.958	7.900
W7	11.044	8.517	7.895
W8	10.563	9.012	7.864
W9	14.601	8.803	7.941
W10	12.045	8.848	7.901
W11	10.000	9.925	7.896
(summer closing error: 0.075)		(winter closing error: 0.018)	
E1	6.372	6.074	4.951
E2	6.534	5.448	4.920
E3	7.373	5.212	4.643
E4	7.752	4.759	4.505
E5	7.280	4.617	4.323
E6	7.142	4.698	4.244
E7	7.495	4.610	4.160
E8	7.546	4.779	4.197
E9	7.811	4.747	4.190
E10	8.046	4.804	4.405
E11	10.000	4.806	4.292
(summer closing error: 0.003)		(winter closing error: 0.001)	

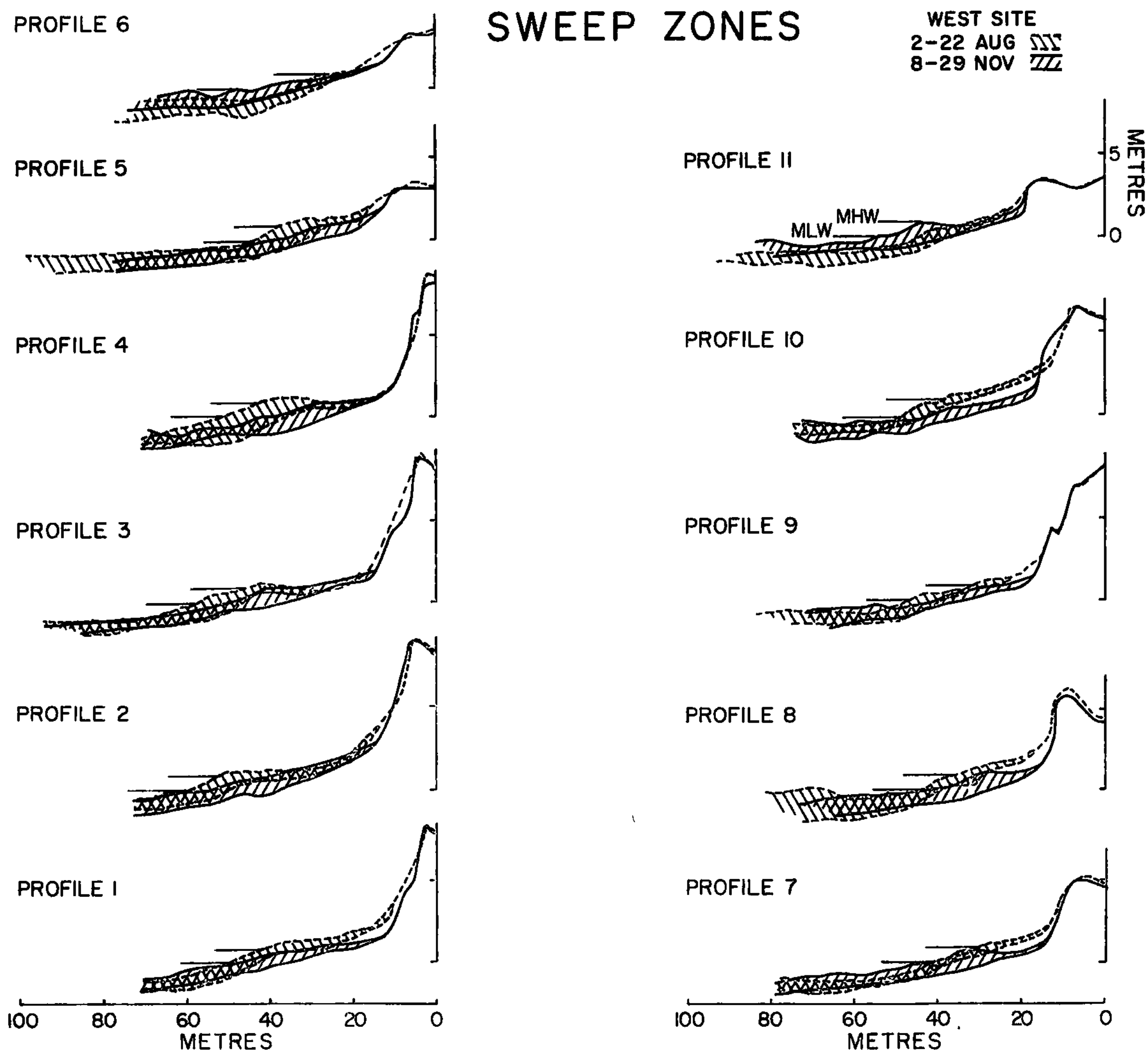


Figure 5.1a Summer and winter sweep zone profiles: west site

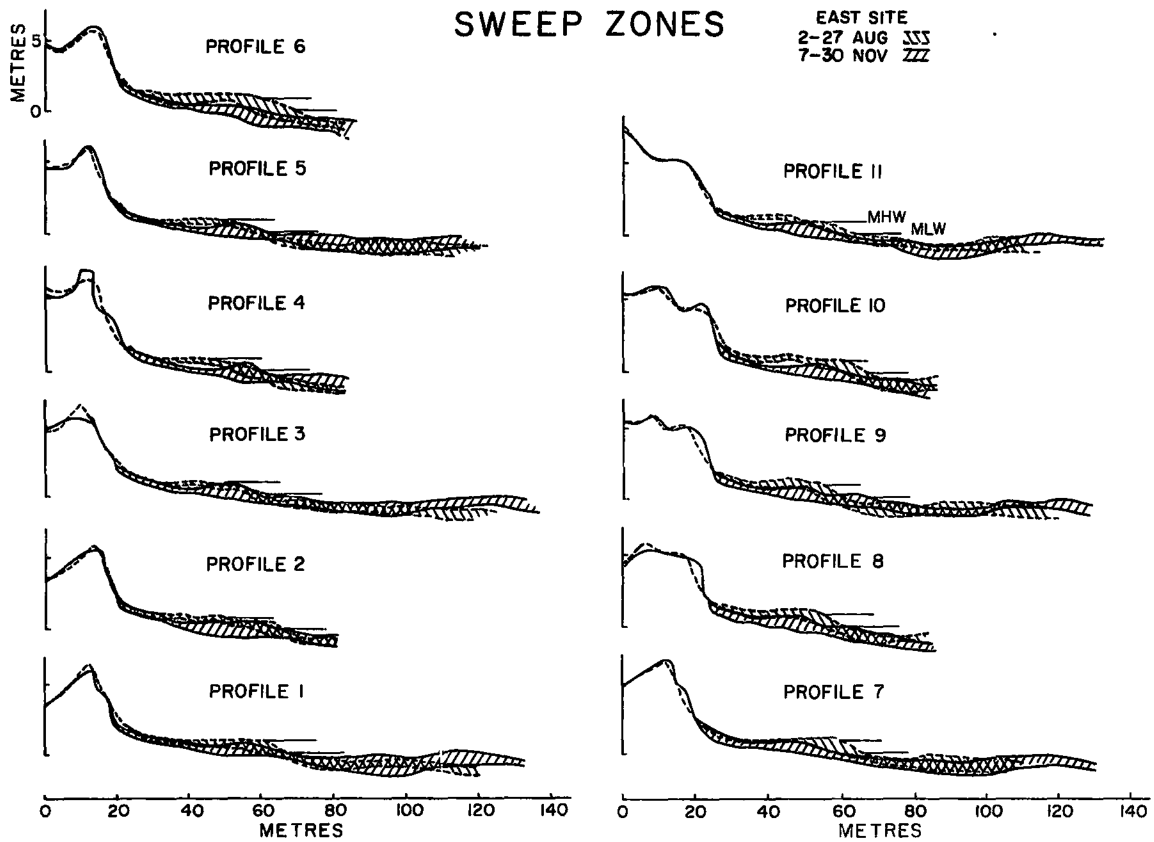
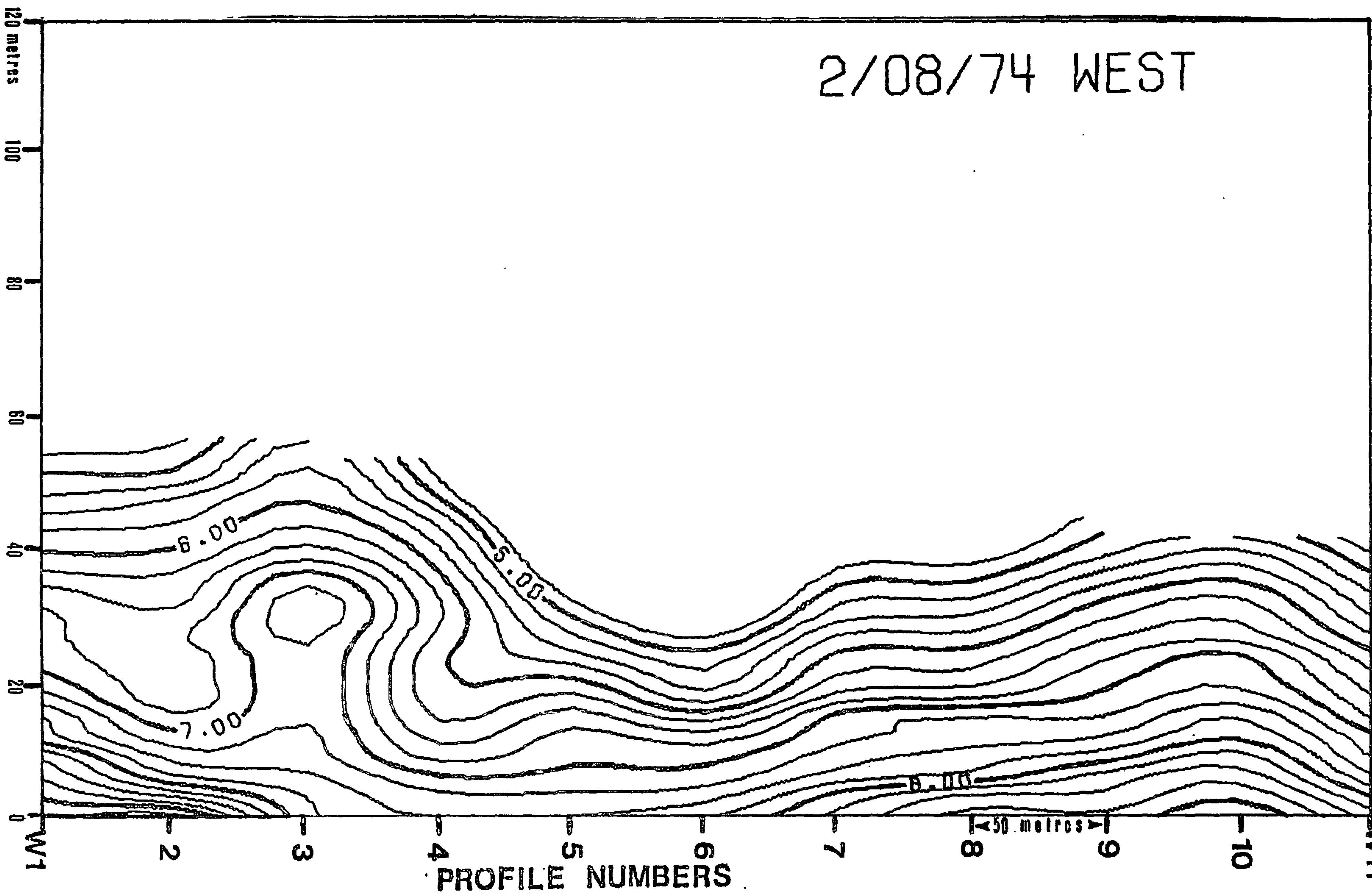


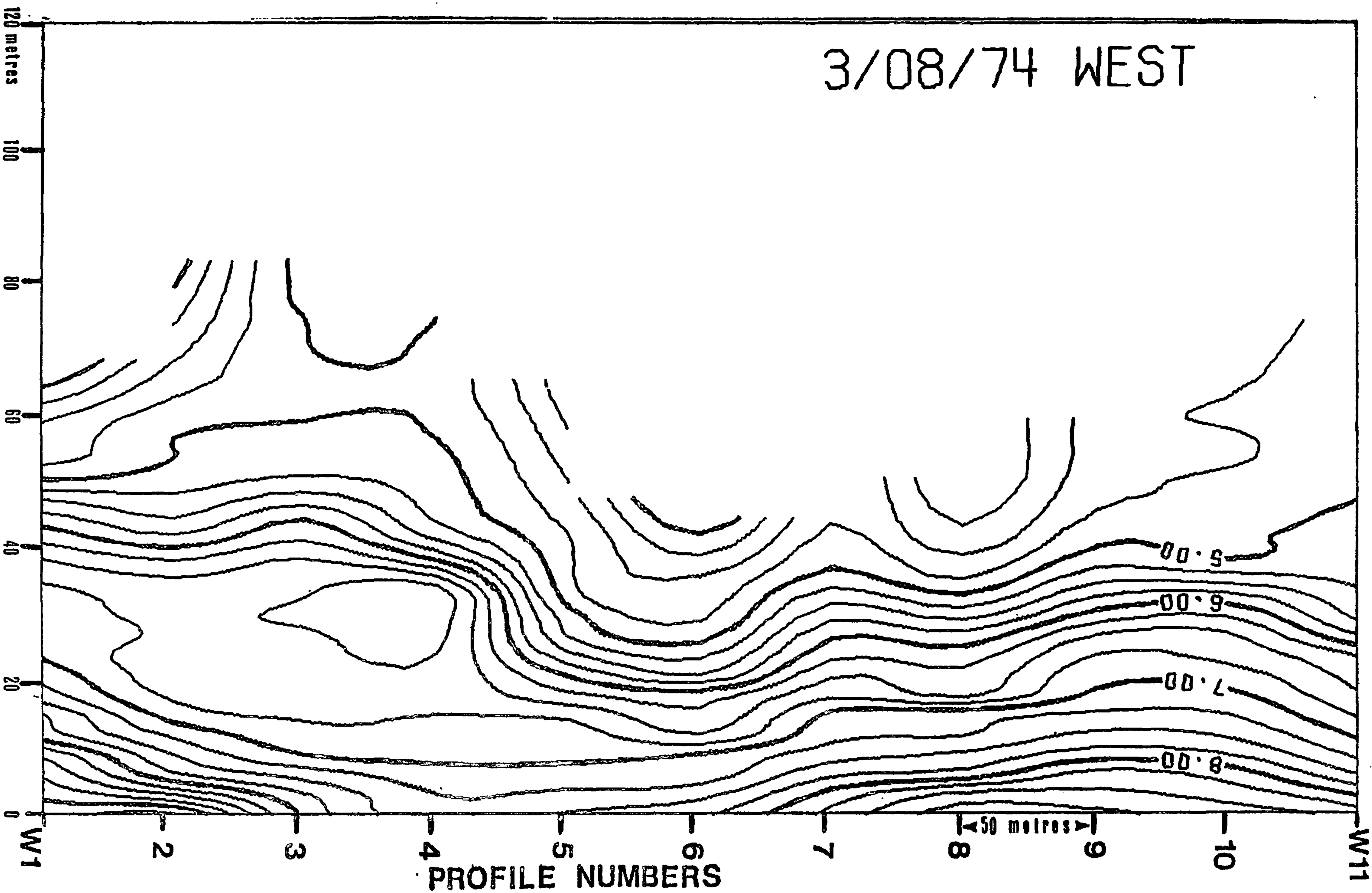
Figure 5.1b Summer and winter sweep zone profiles: east site

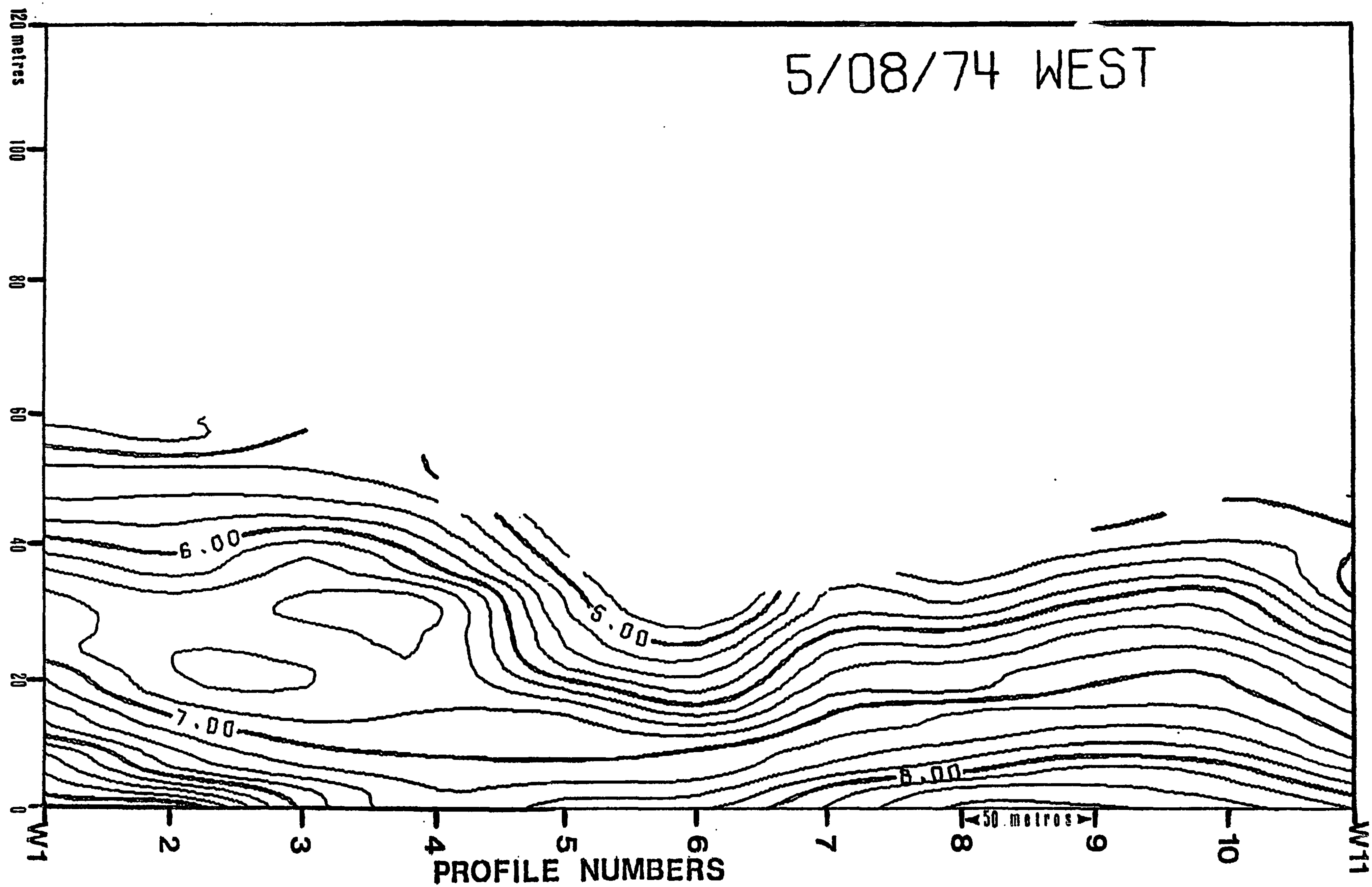
CONTOURED BEACH MAPS

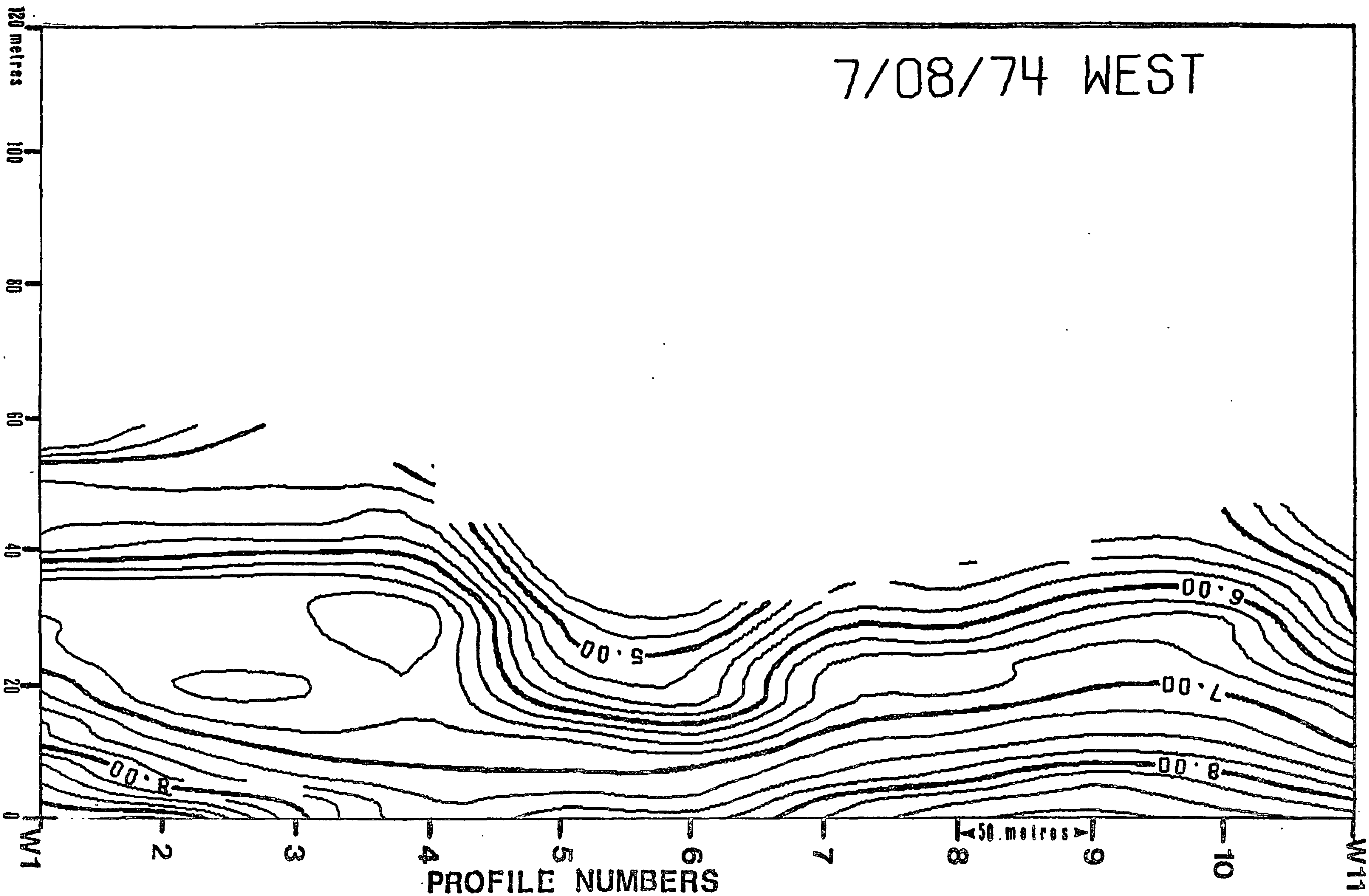
Summer west



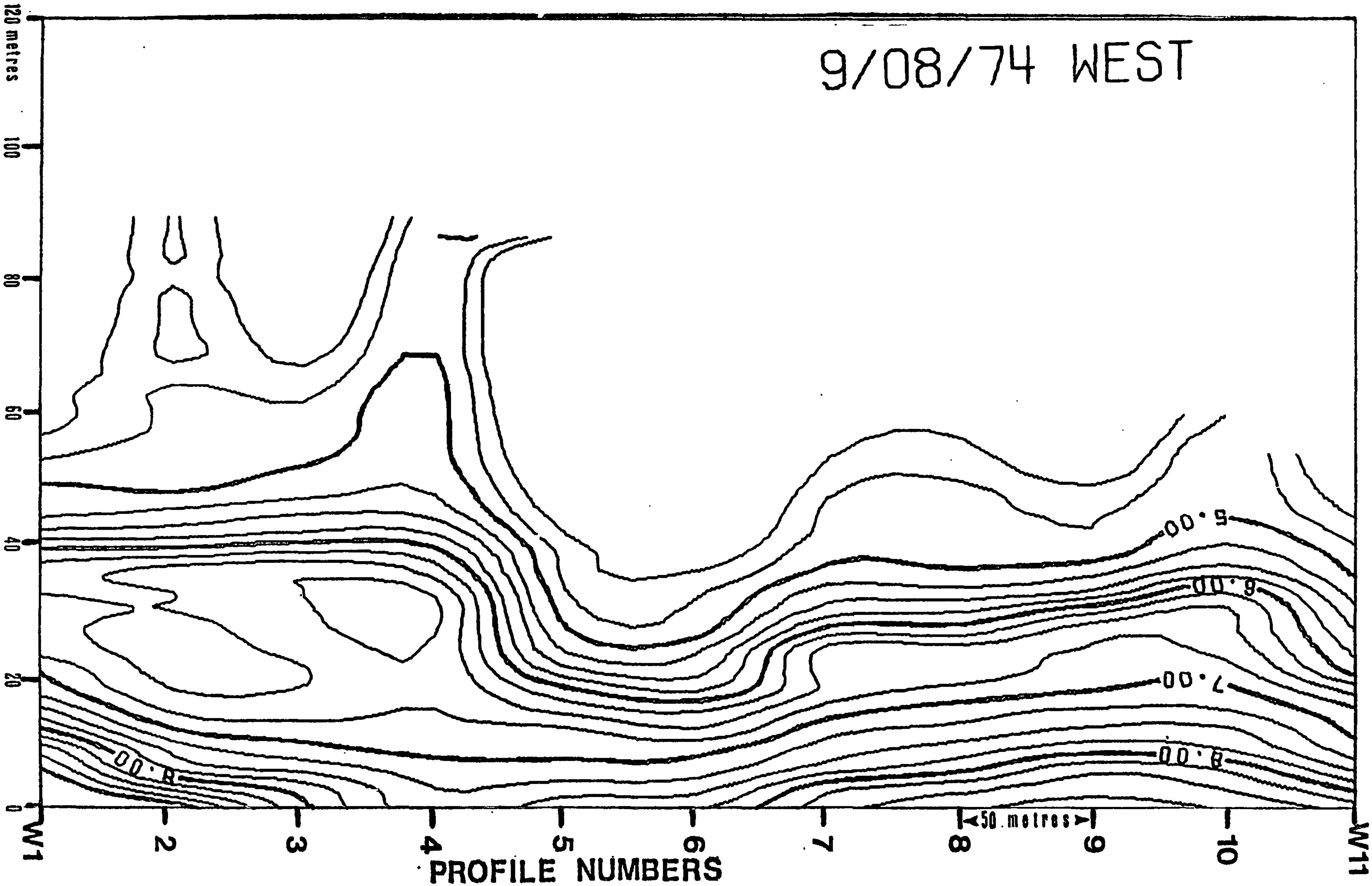
2/08/74 WEST
120 metres
100
80
60
40
20
0
6.00
5.00
7.00
8.00
50 metres
W1
2
3
4
5
6
7
8
9
10
W11
PROFILE NUMBERS

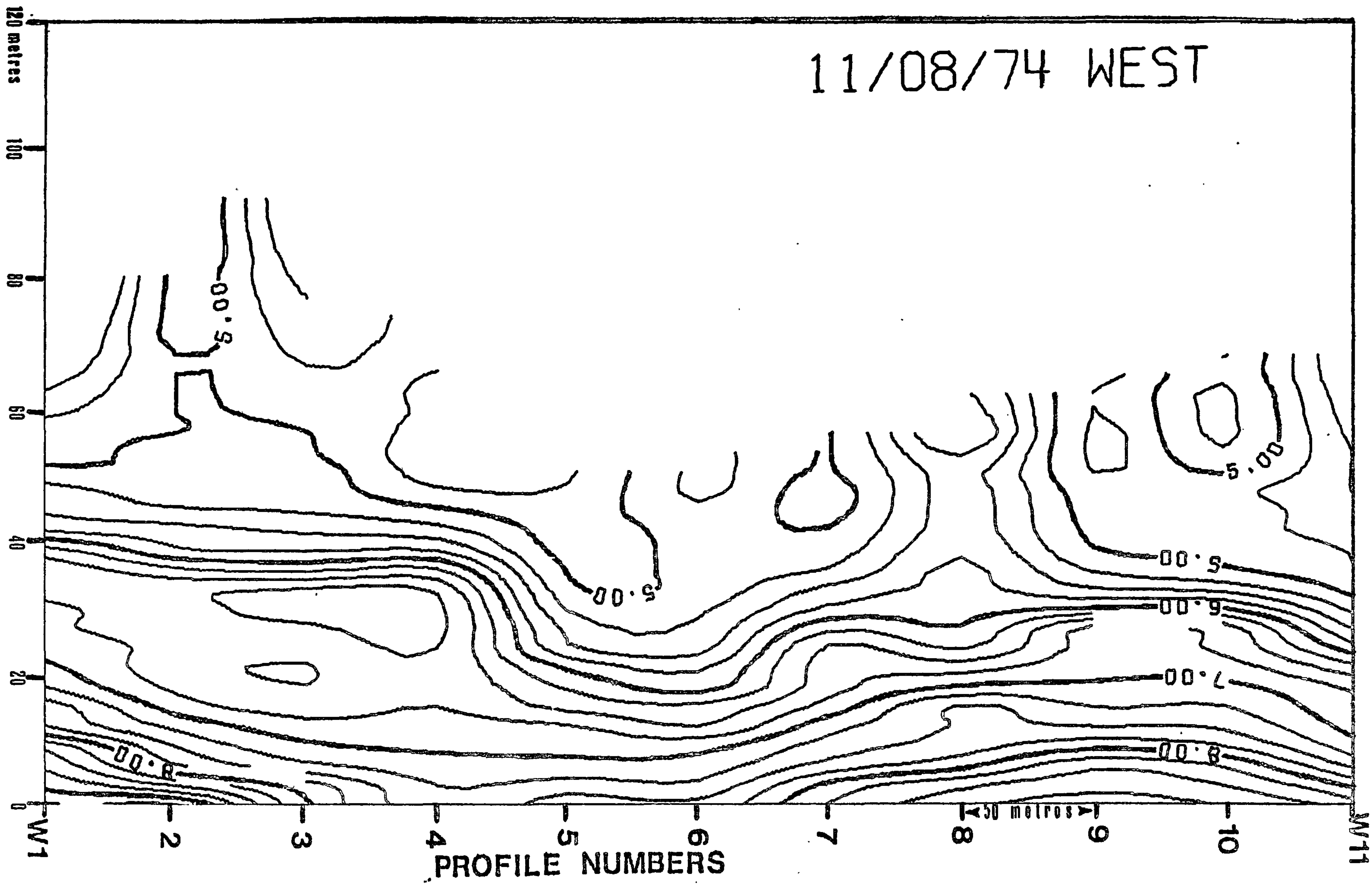

3/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS


5/08/74 WEST
120 metres
100
80
60
40
20
0
6.00
5.00
7.00
8.00
50 metres
W1
2
3
4
5
6
7
8
9
10
W11
PROFILE NUMBERS

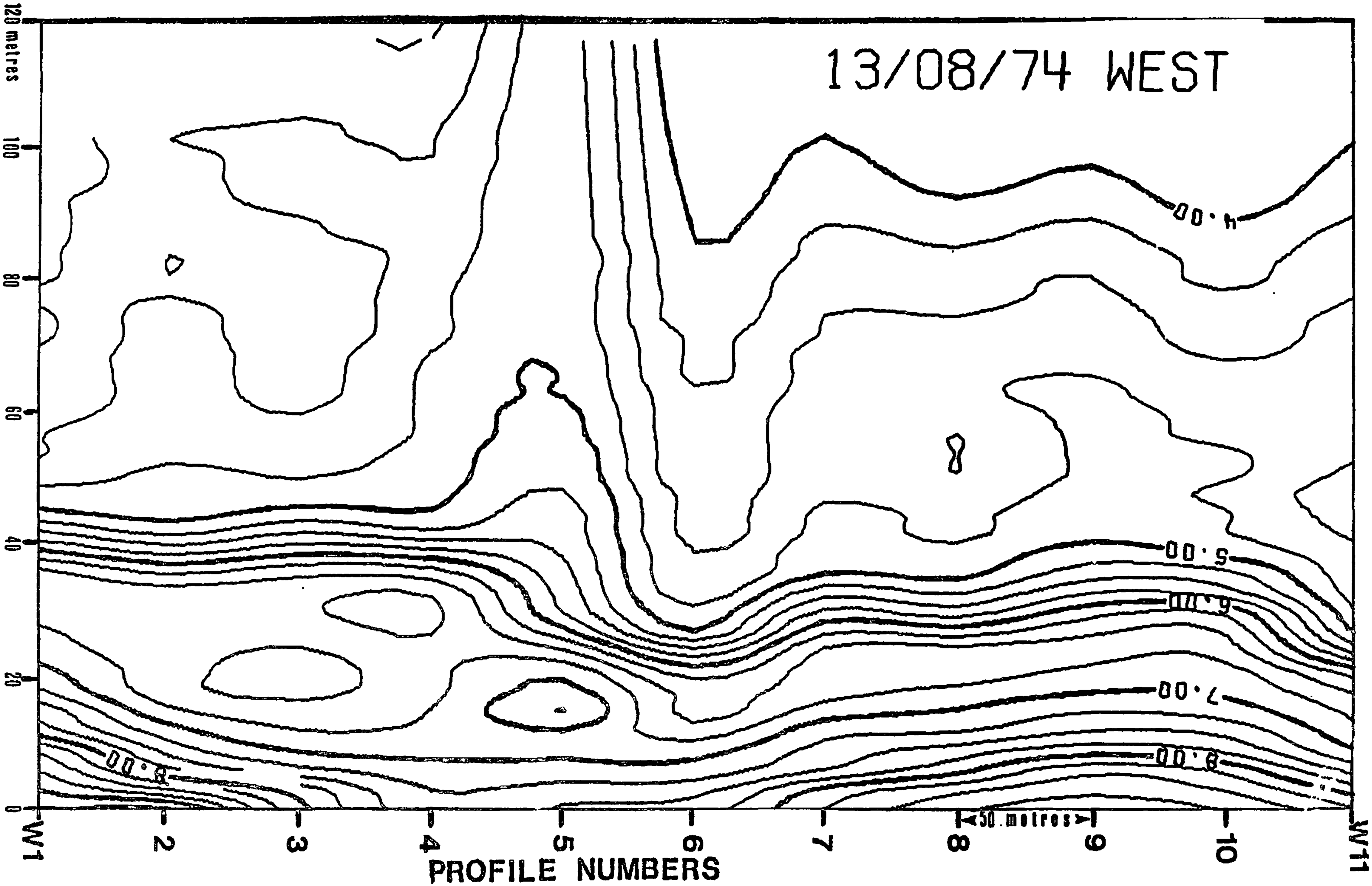


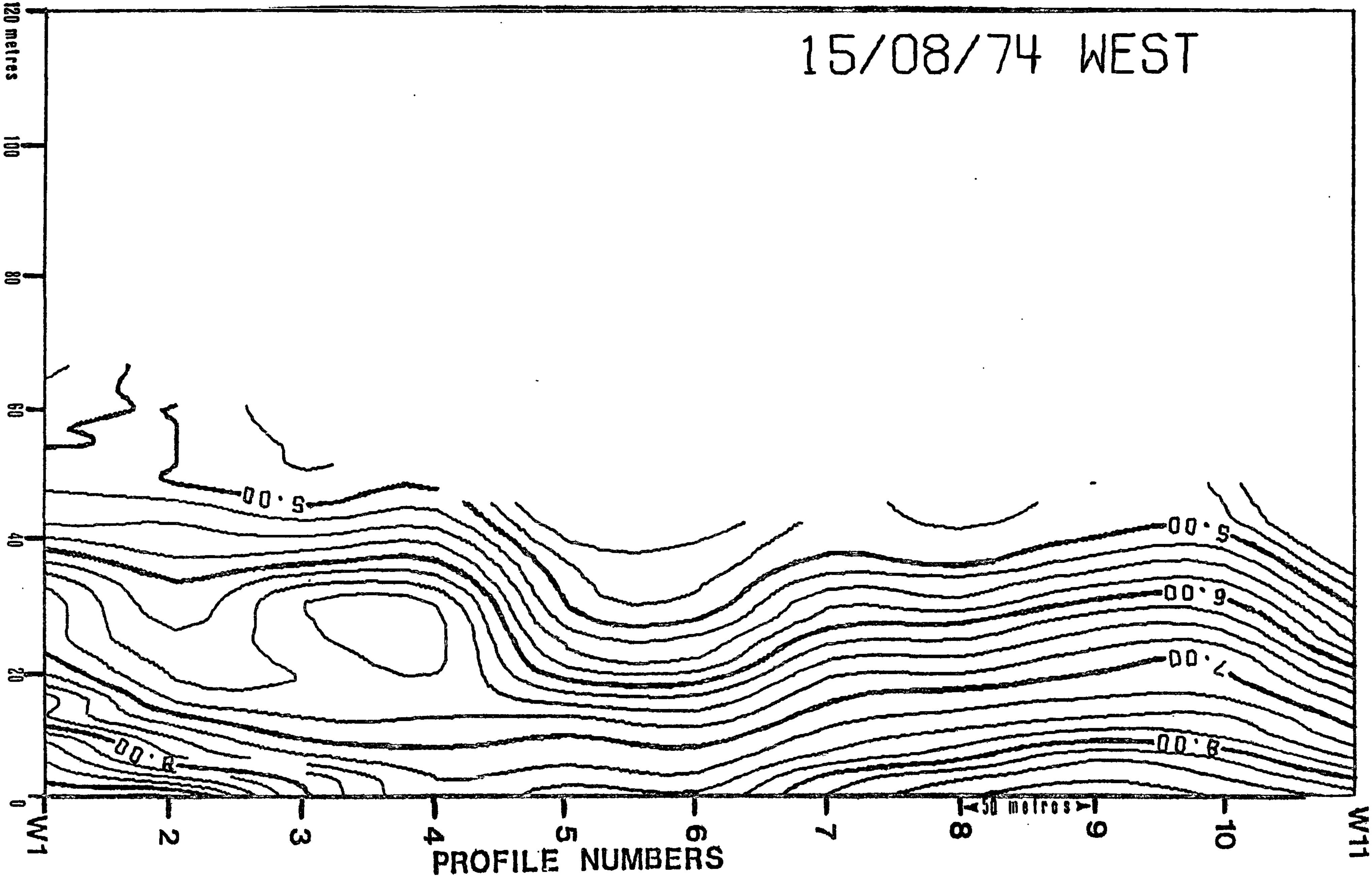
7/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
8.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS

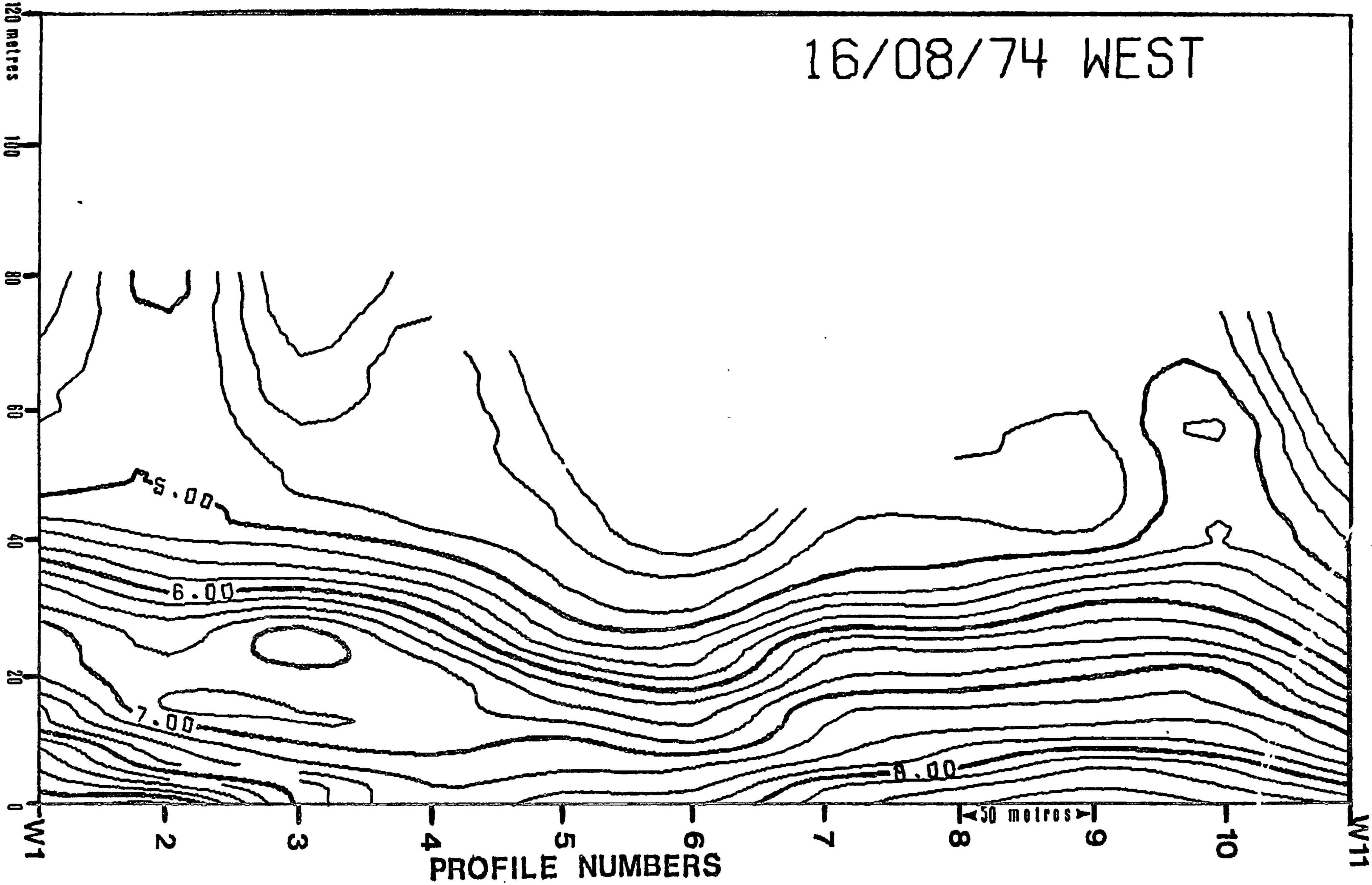

9/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
8.00
W1
2
3
4
5
6
7
8
50 metres
9
10
W11
PROFILE NUMBERS

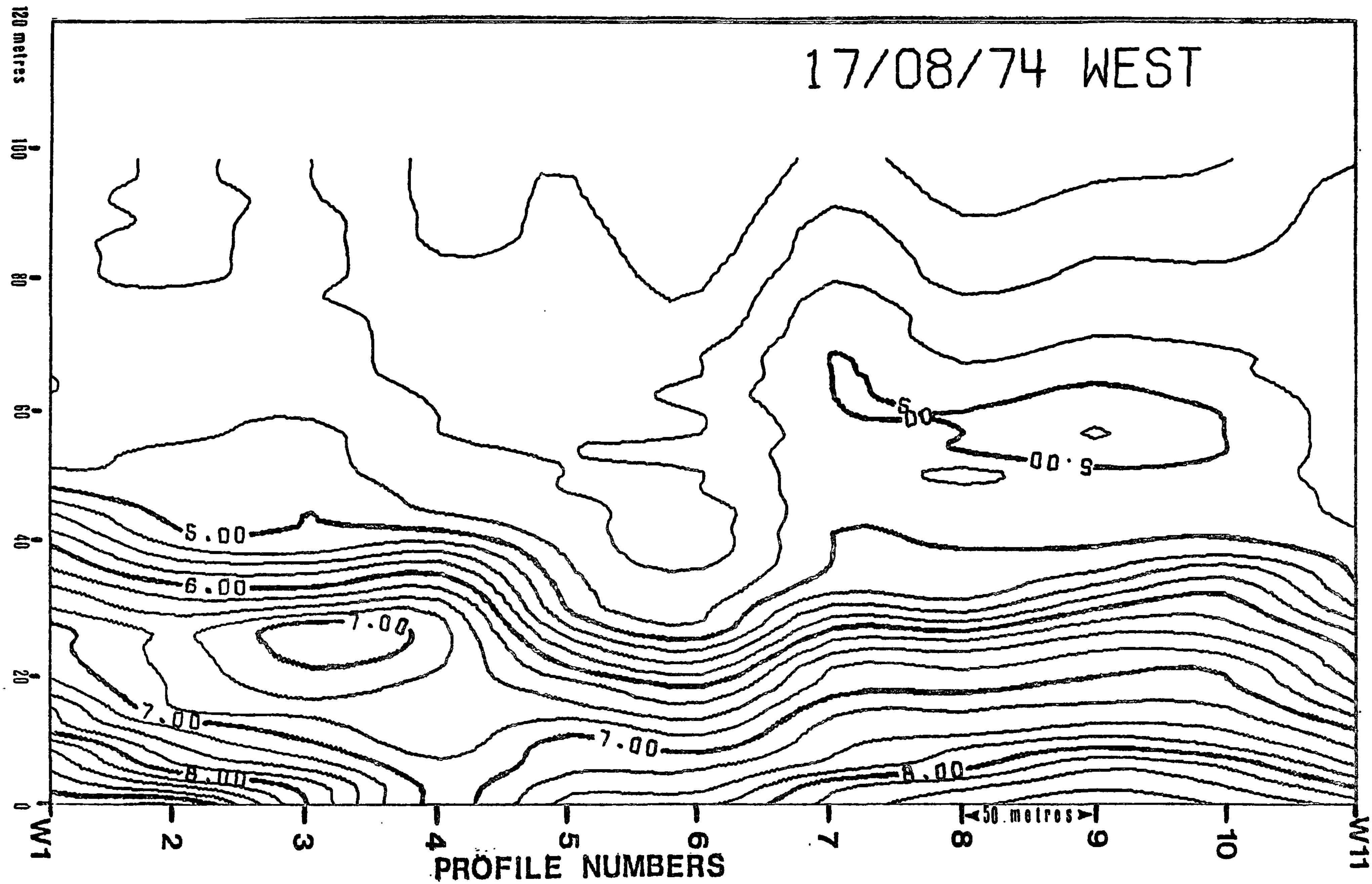


11/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
5.00
5.00
5.00
6.00
7.00
8.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS

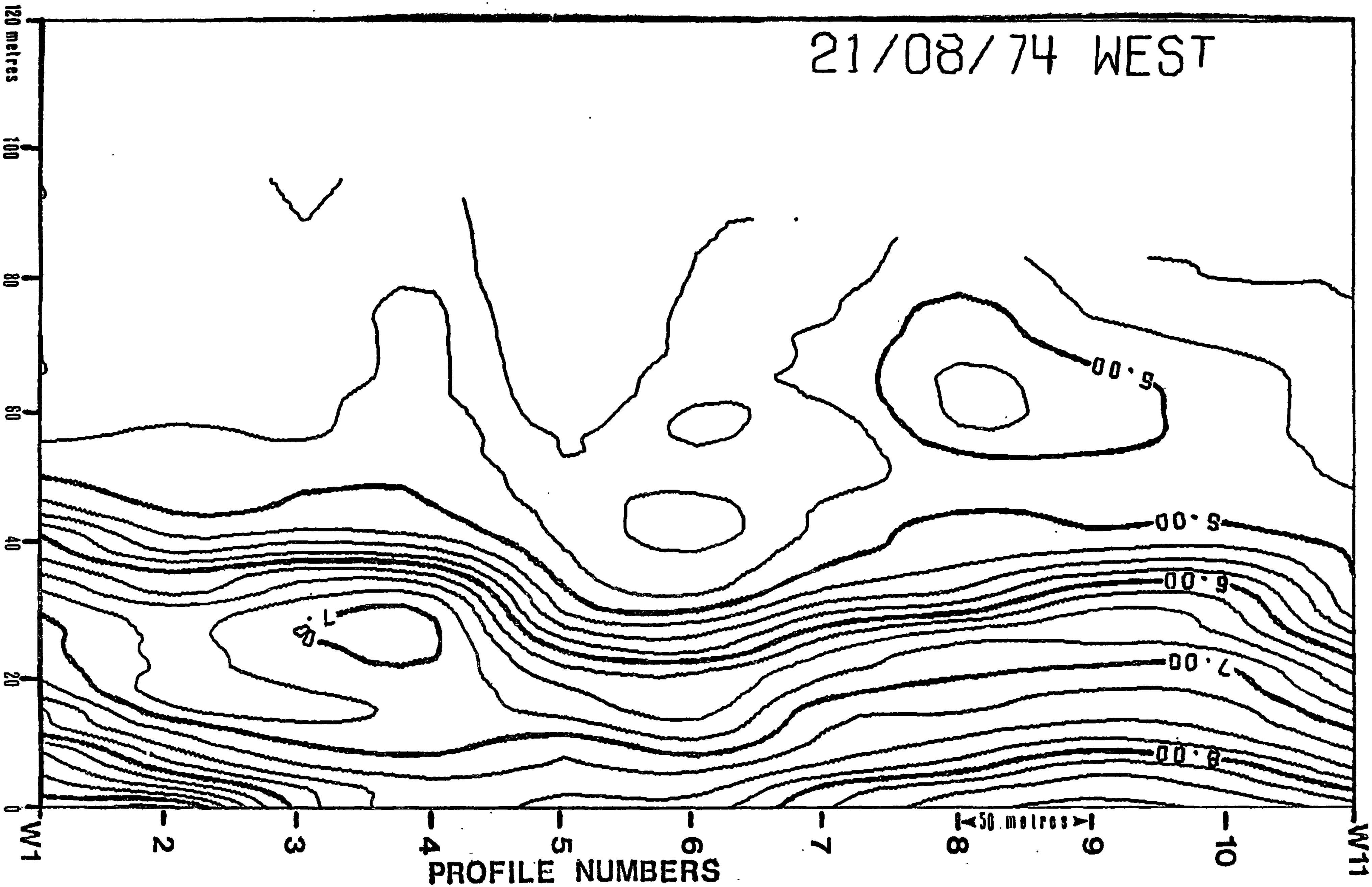

13/08/74 WEST
120 metres
100
80
60
40
20
0
4.00
5.00
6.00
7.00
8.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS


15/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
8.00
50 metres
W1
2
3
4
5
6
7
8
9
10
W11
PROFILE NUMBERS

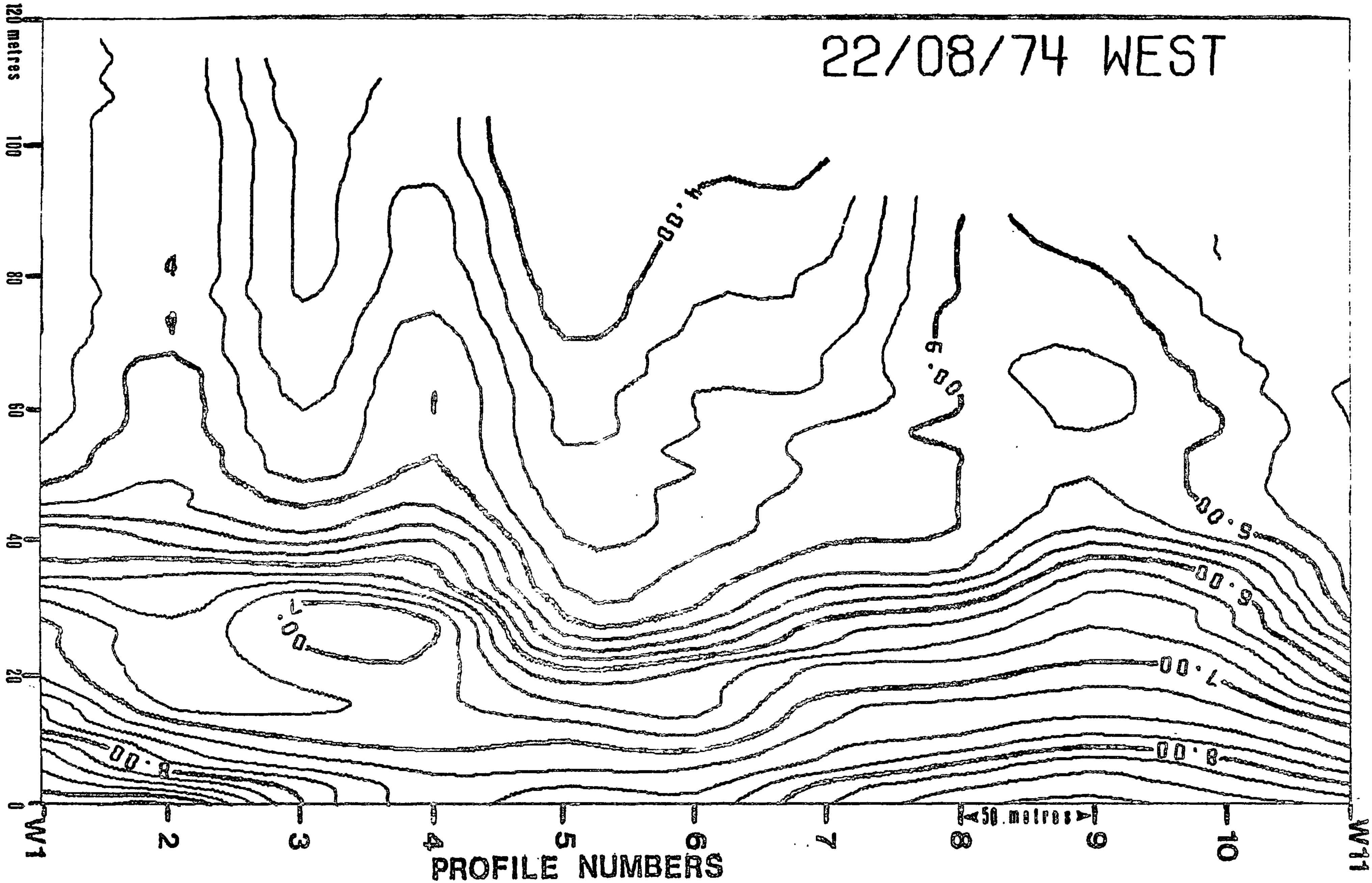

16/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS



17/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
7.00
7.00
8.00
8.00
5.00
5.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS

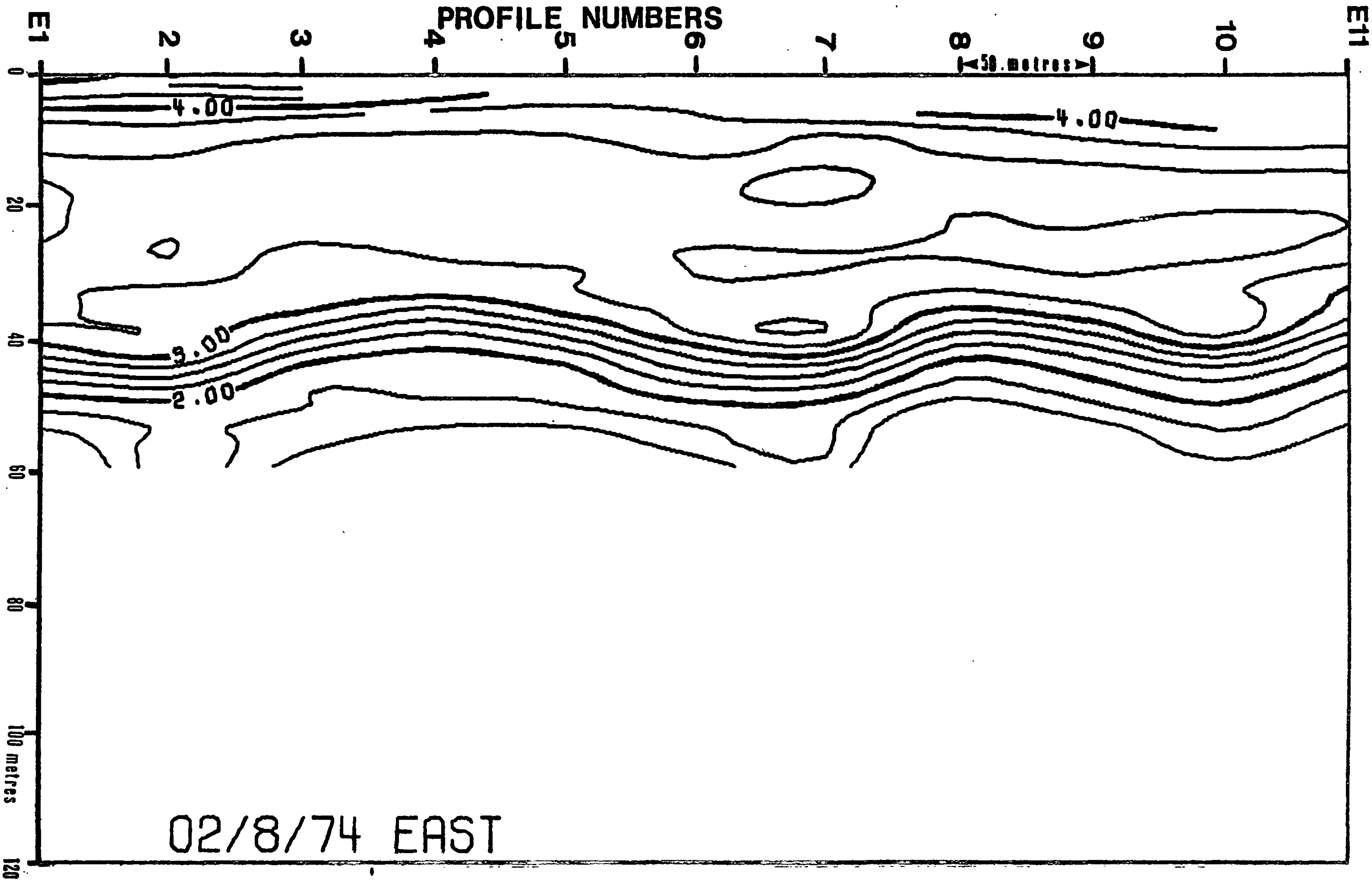


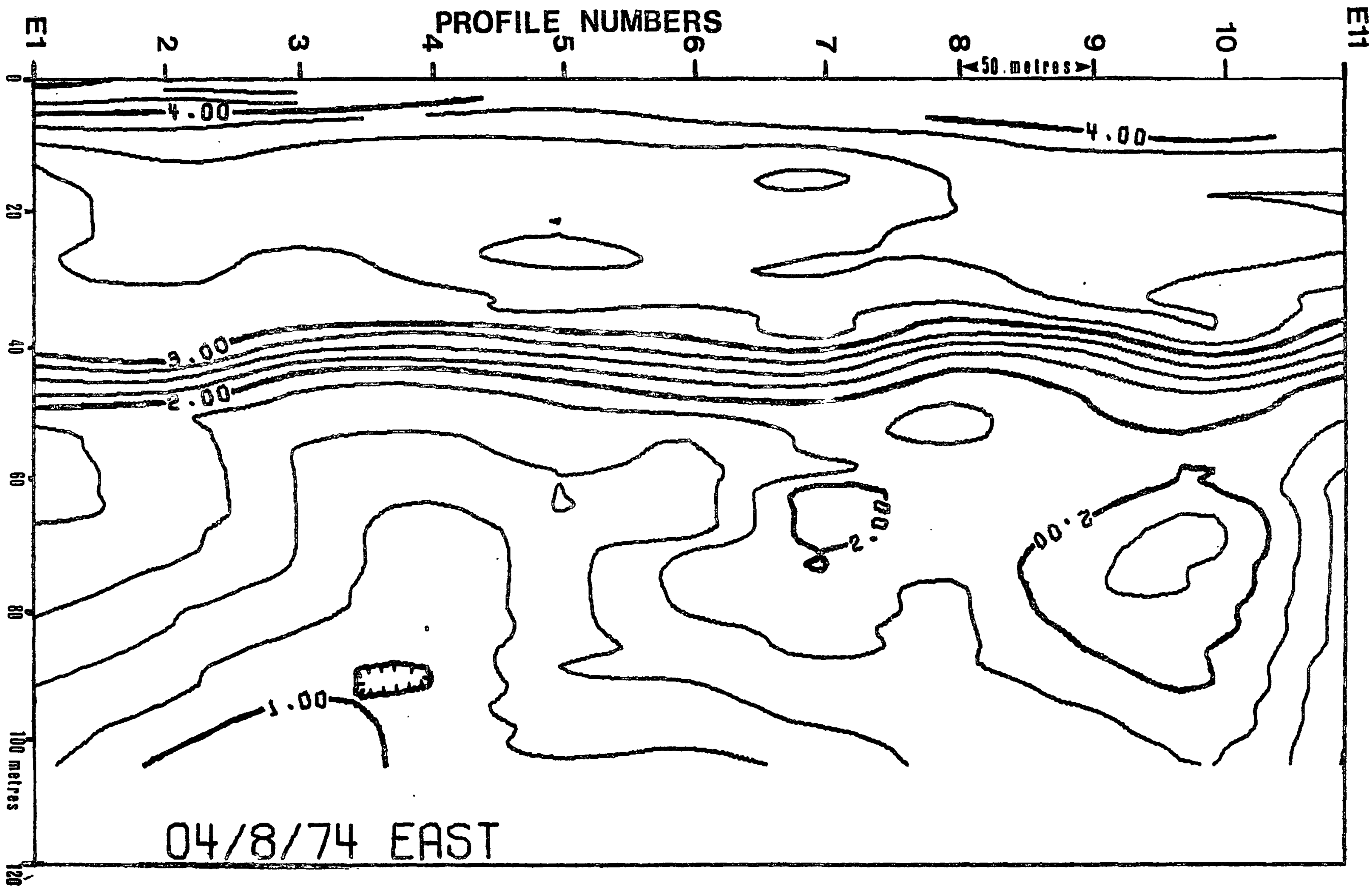
21/08/74 WEST
120 metres
100
80
60
40
20
0
5.00
5.00
6.00
7.00
7.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
|←50 metres→|
PROFILE NUMBERS

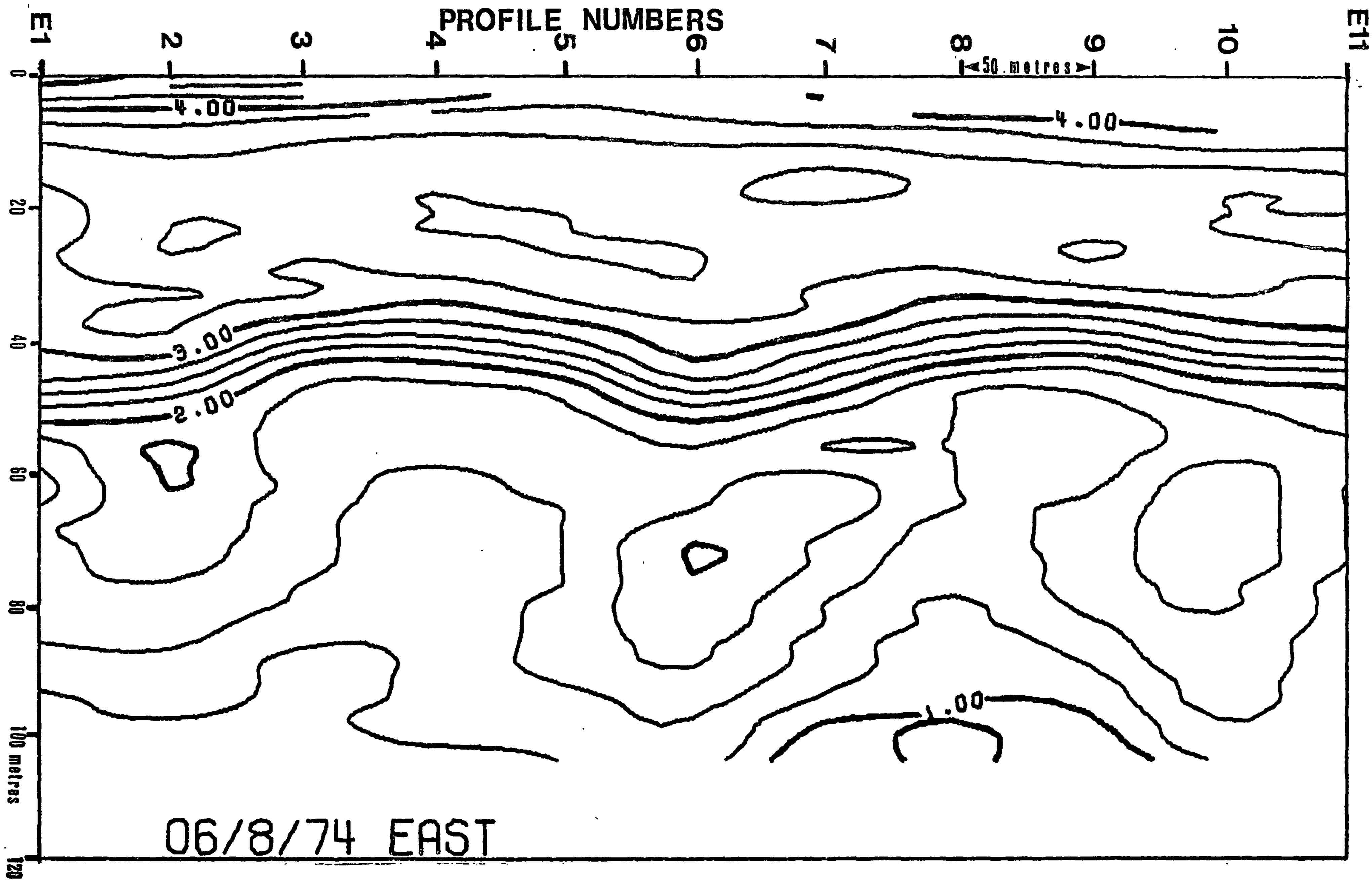

22/08/74 WEST
120 metres
100
80
60
40
20
0
4.00
5.00
6.00
7.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS

CONTOURED BEACH MAPS

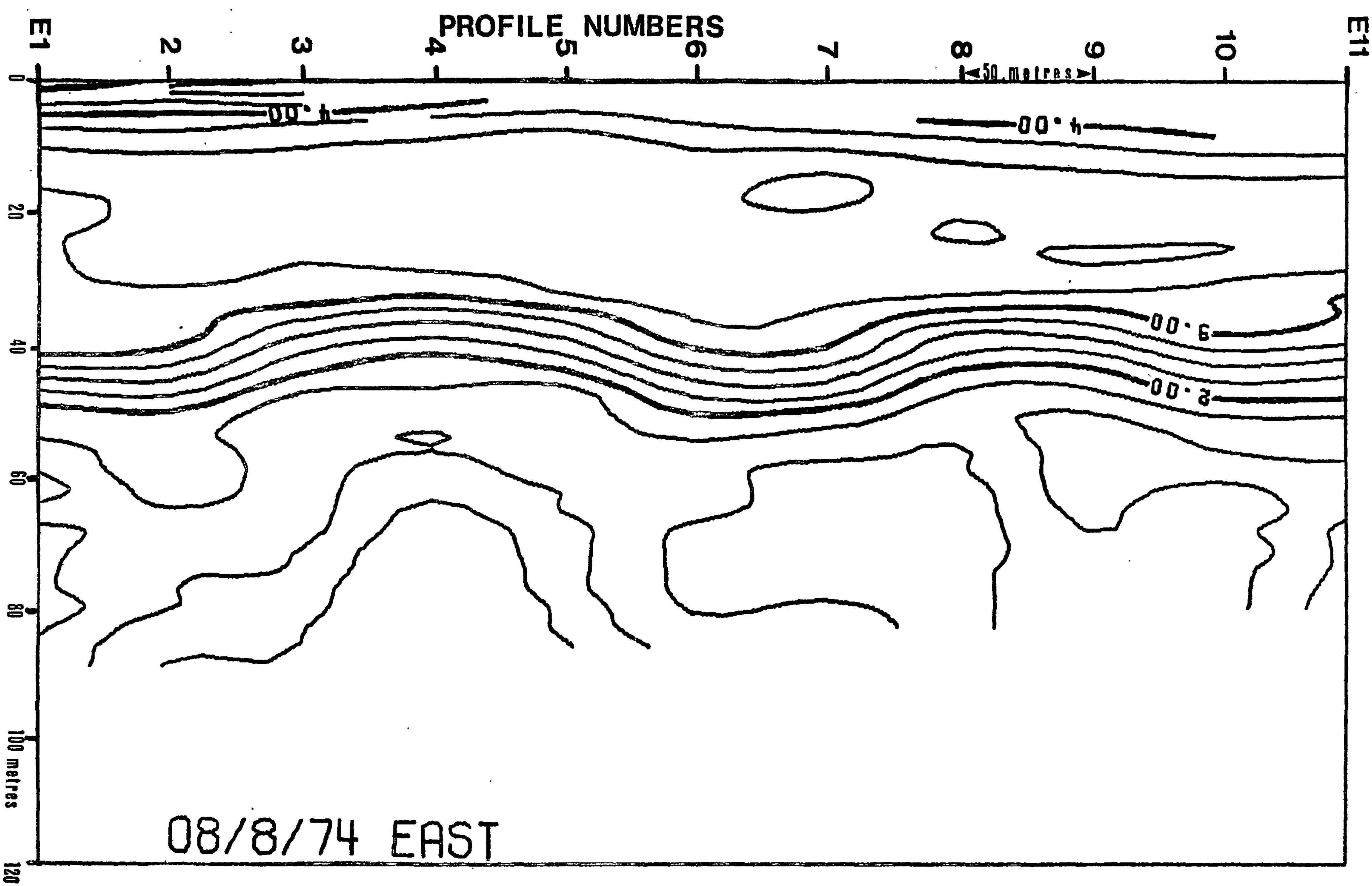
Summer east


PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
3.00
2.00
0
20
40
60
80
100 metres
120
02/8/74 EAST

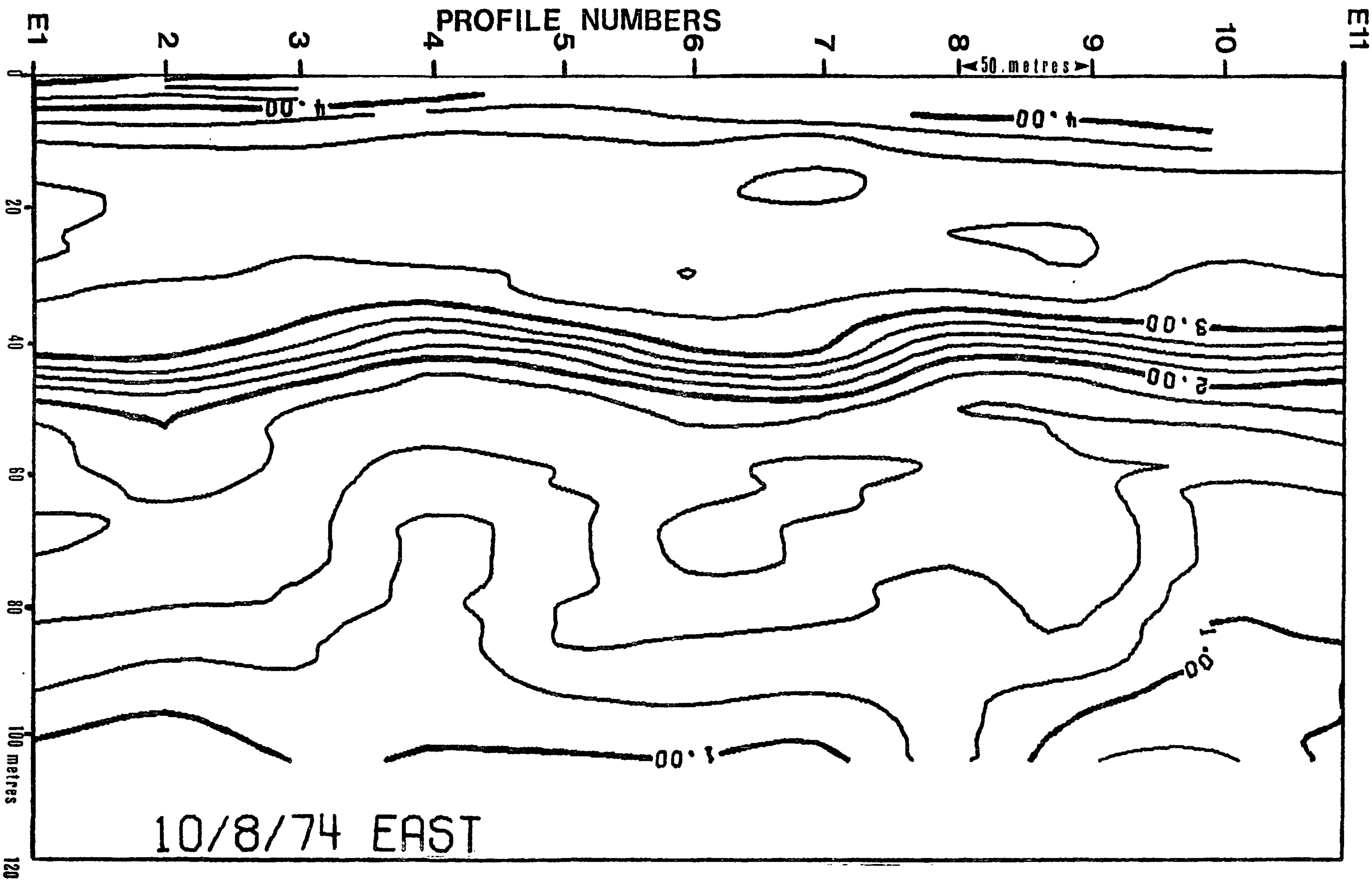

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
0
20
40
60
80
100 metres
120
4.00
4.00
3.00
2.00
2.00
2.00
1.00
04/8/74 EAST

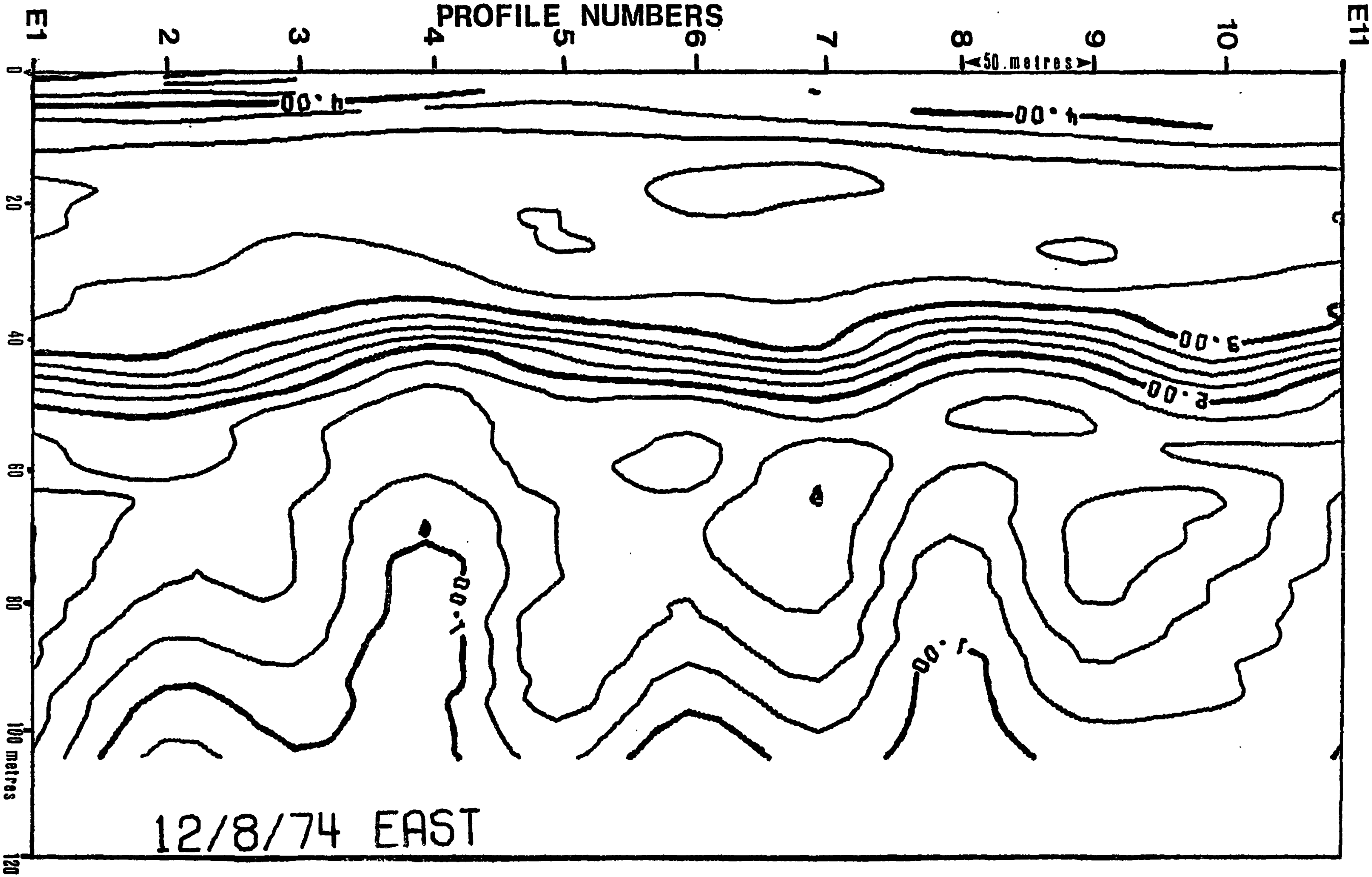


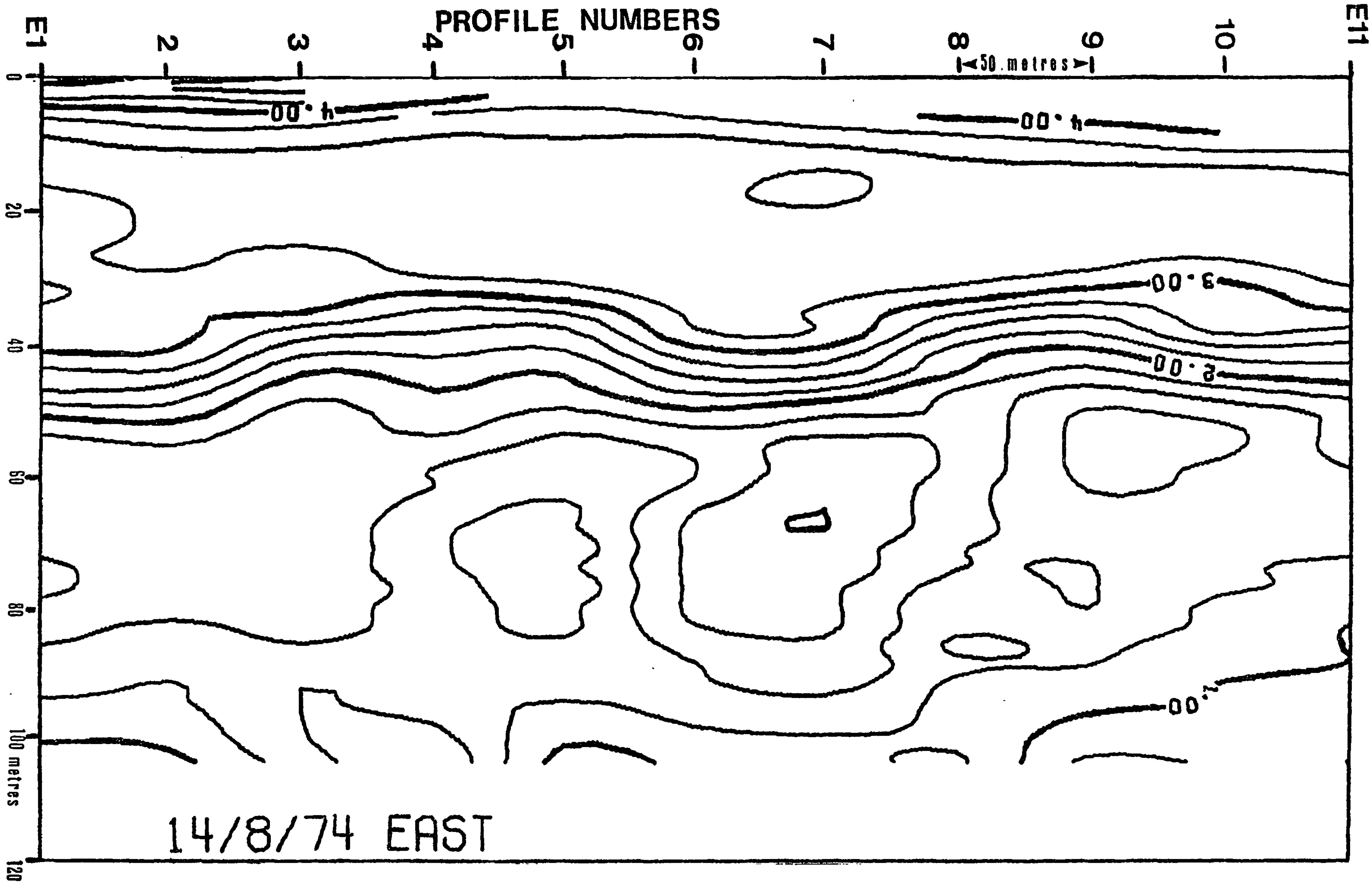
PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
0
20
40
60
80
100 metres
120
4.00
4.00
3.00
2.00
1.00
06/8/74 EAST

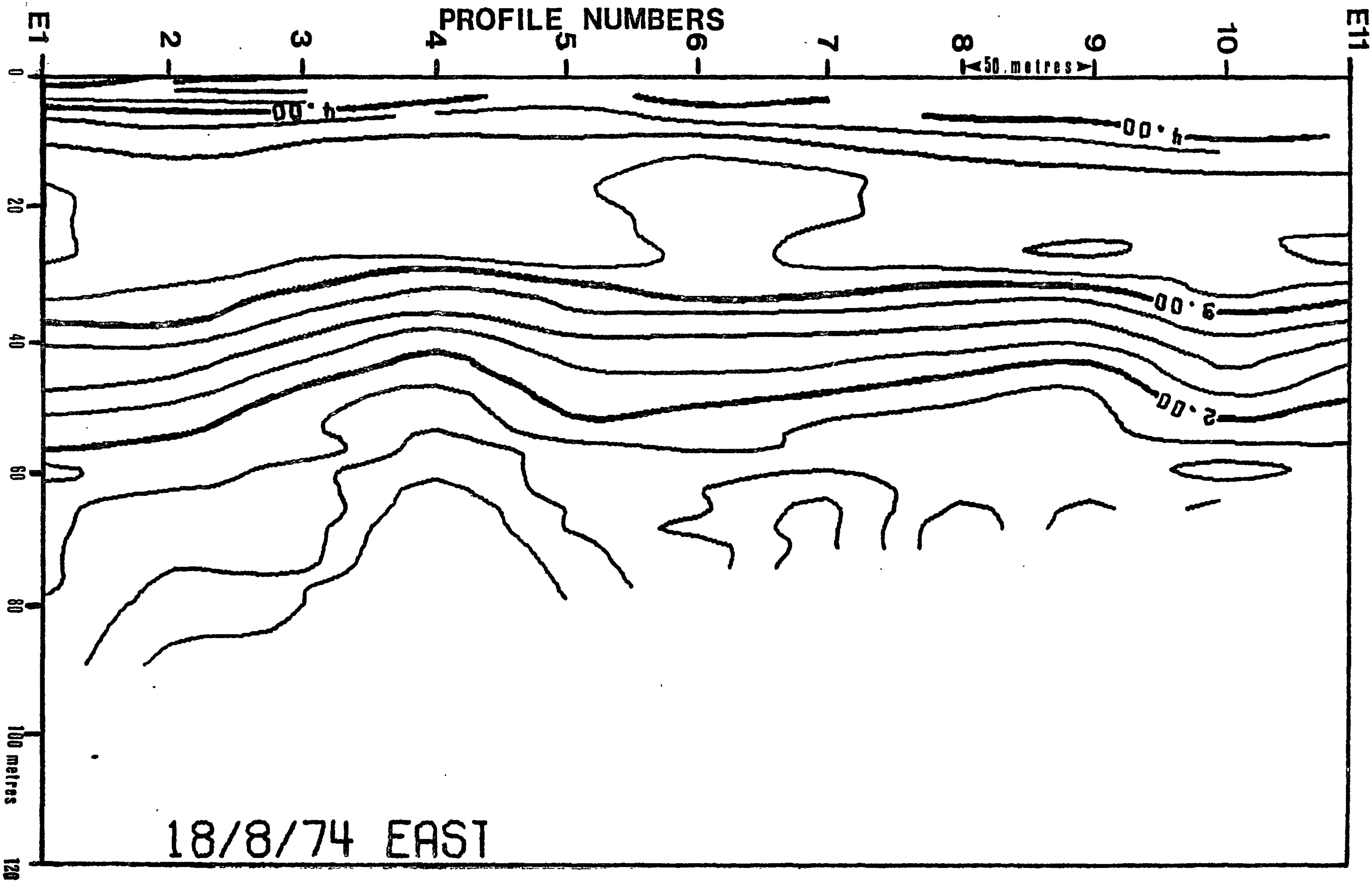


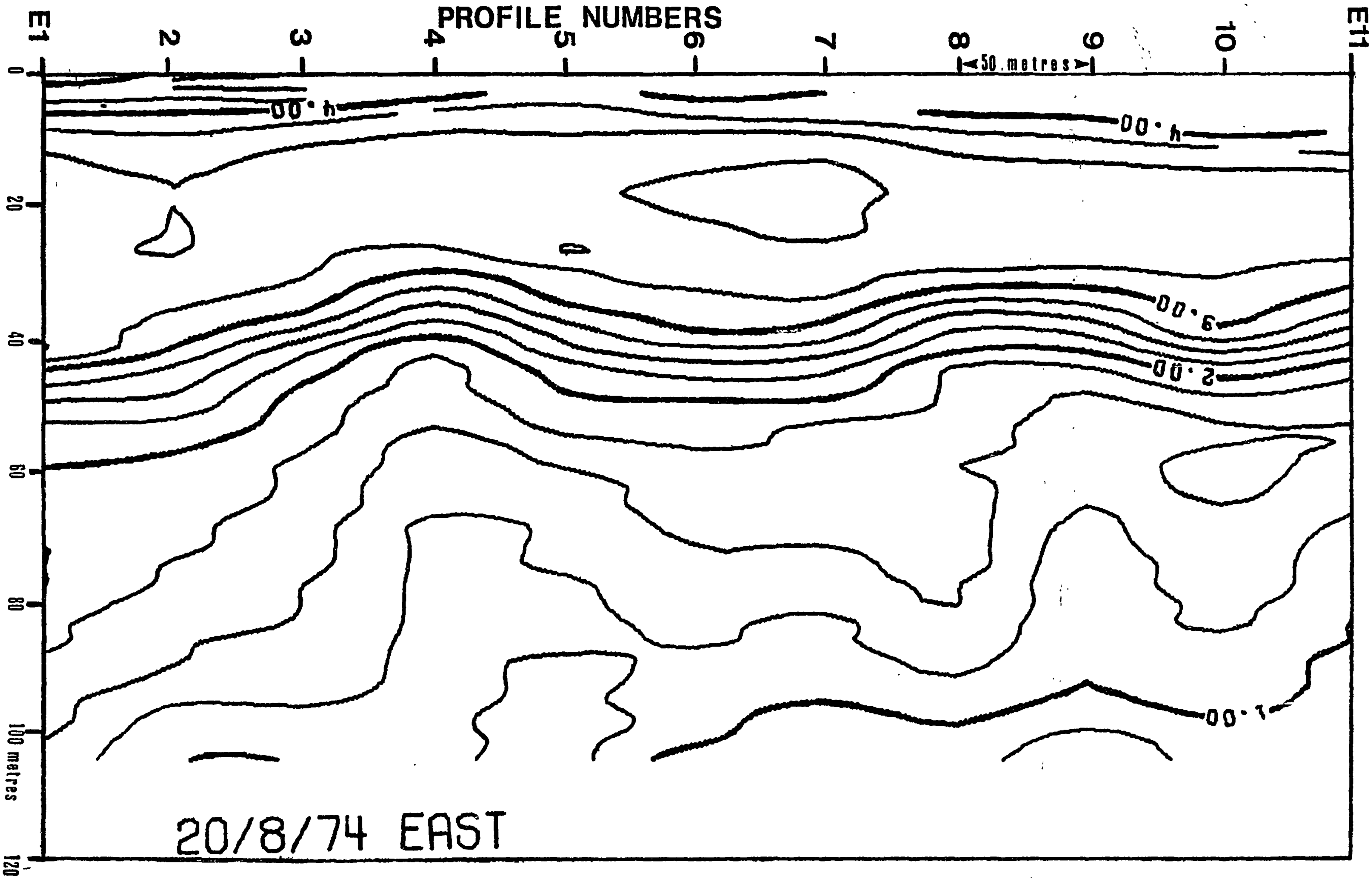
PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
6.00
2.00
0
20
40
60
80
100 metres
120
08/8/74 EAST

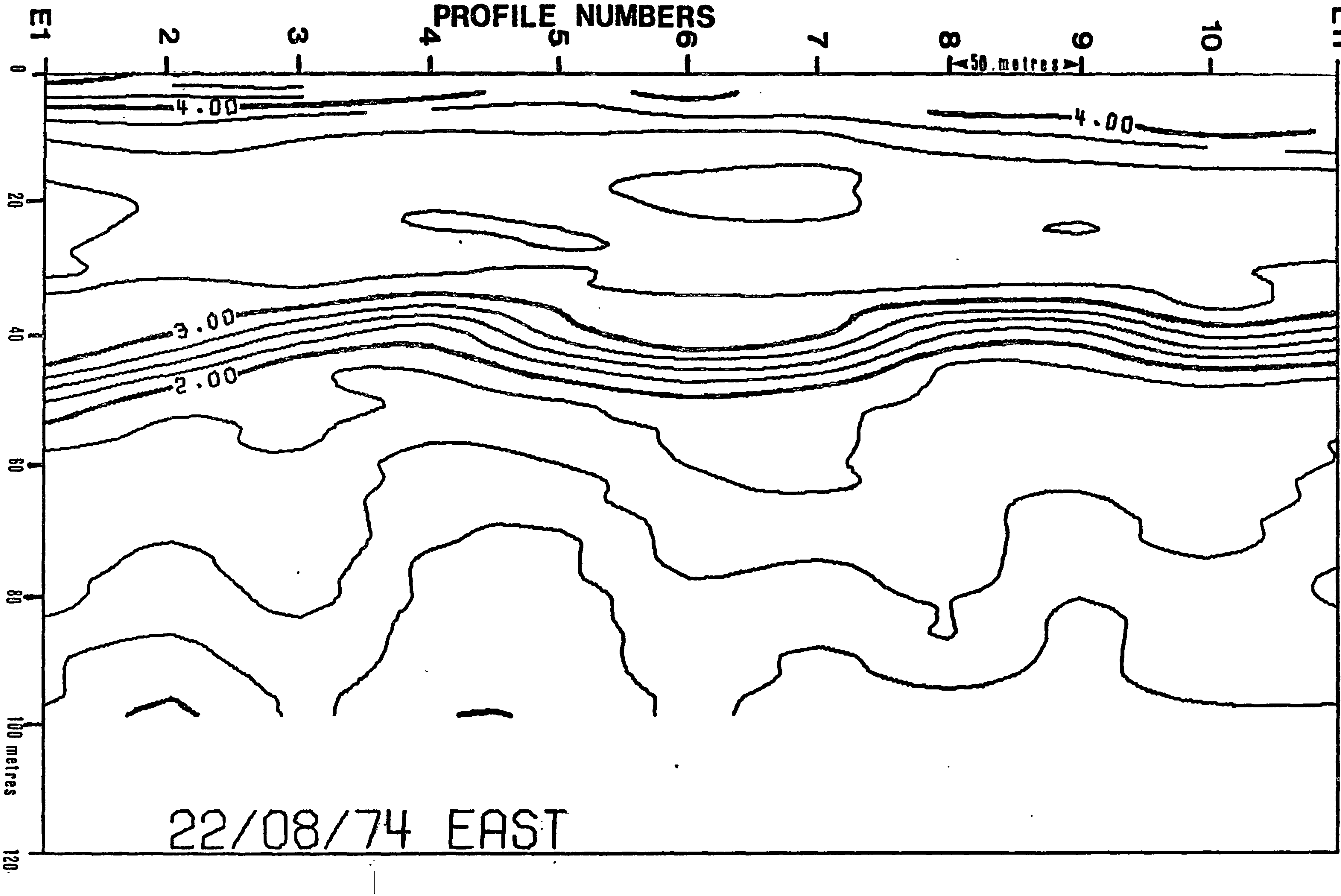

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
3.00
2.00
1.00
1.00
1.00
0
20
40
60
80
100 metres
120
10/8/74 EAST


PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
3.00
2.00
1.00
1.00
0
20
40
60
80
100 metres
120
12/8/74 EAST

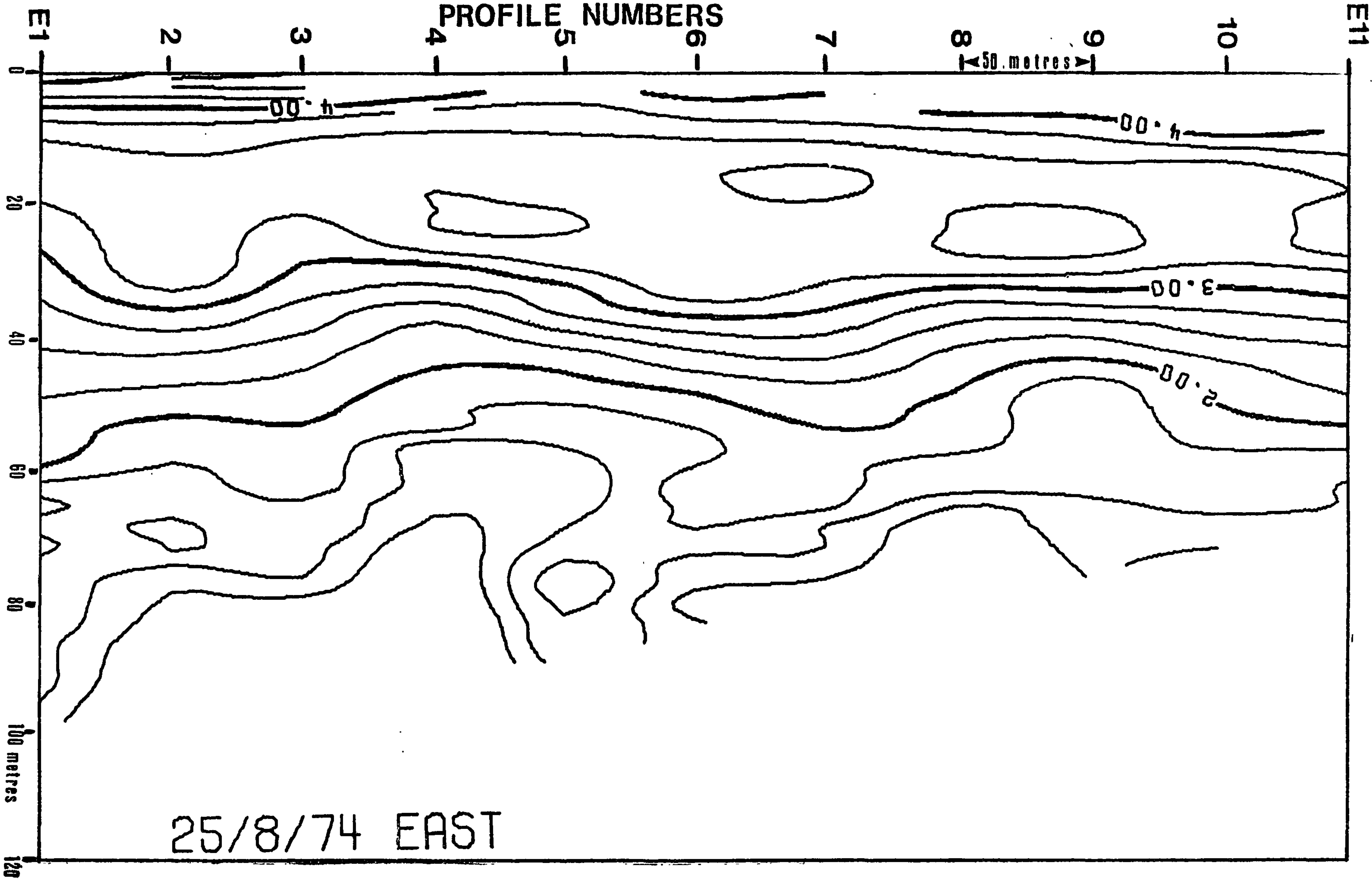

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
2.00
0
20
40
60
80
100 metres
120
14/8/74 EAST


PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
6.00
2.00
0
20
40
60
80
100 metres
120
18/8/74 EAST

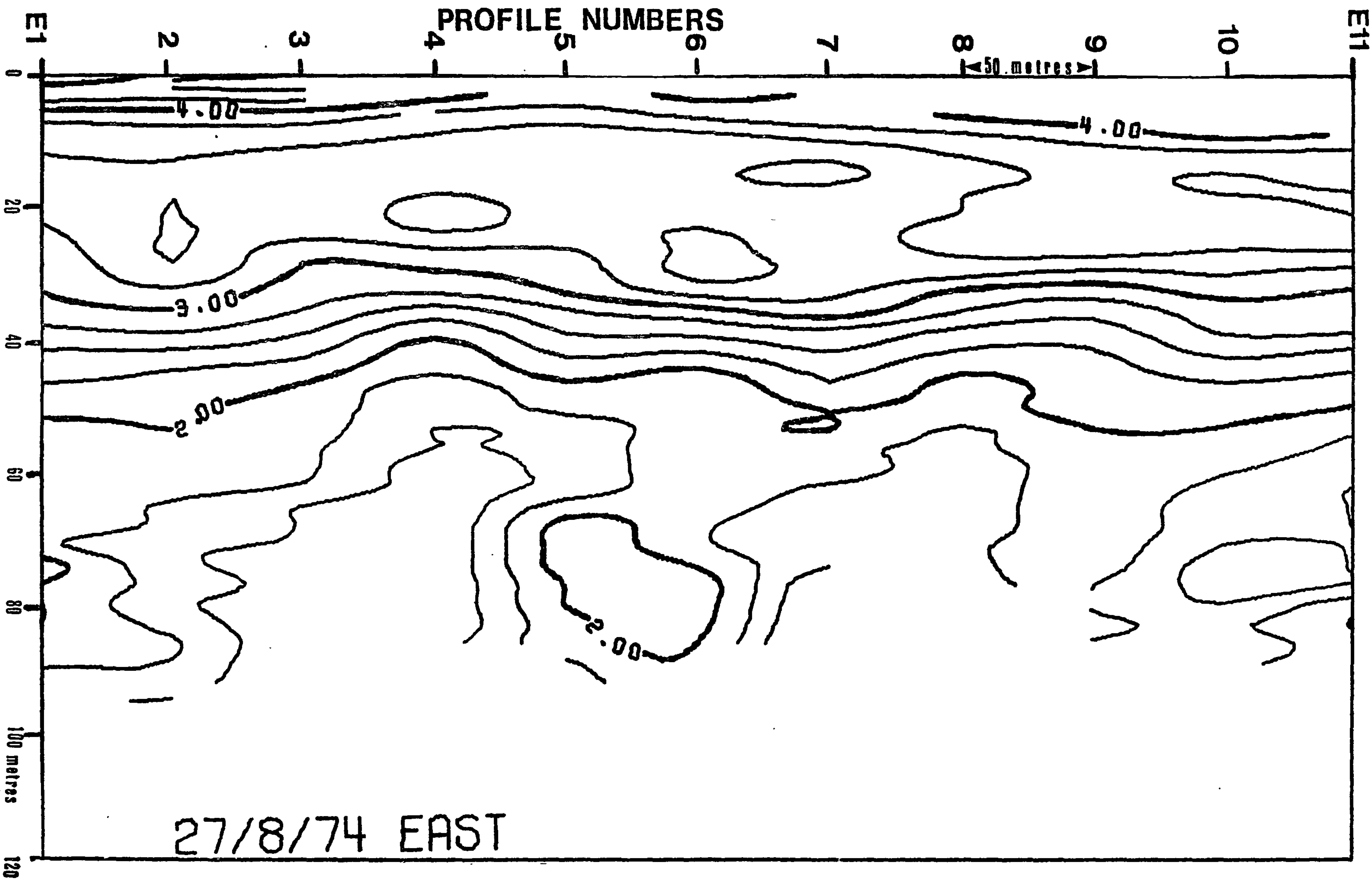

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
3.00
2.00
1.00
0
20
40
60
80
100
120
metres
20/8/74 EAST



PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
3.00
2.00
0
20
40
60
80
100 metres
120
22/08/74 EAST

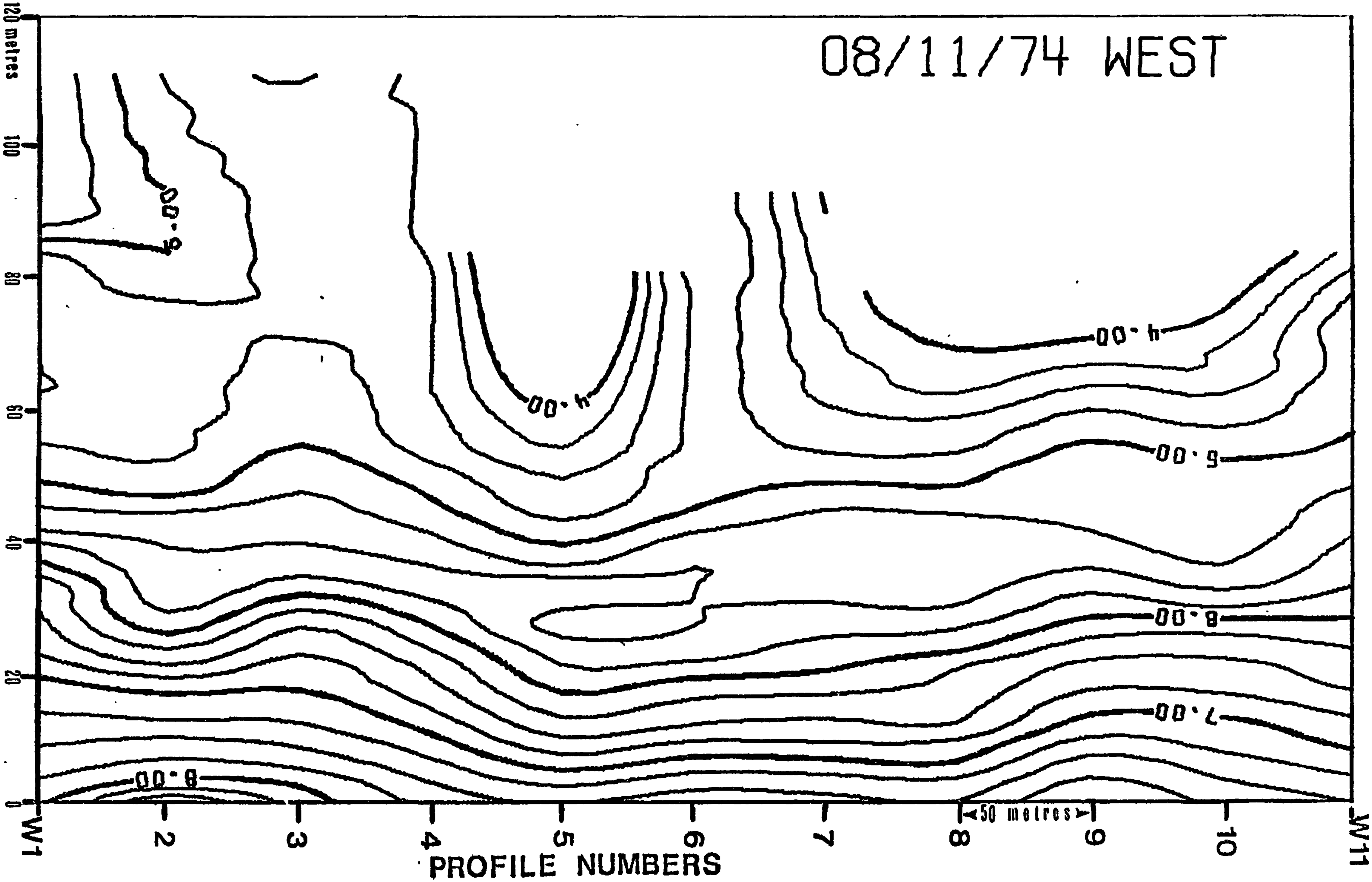


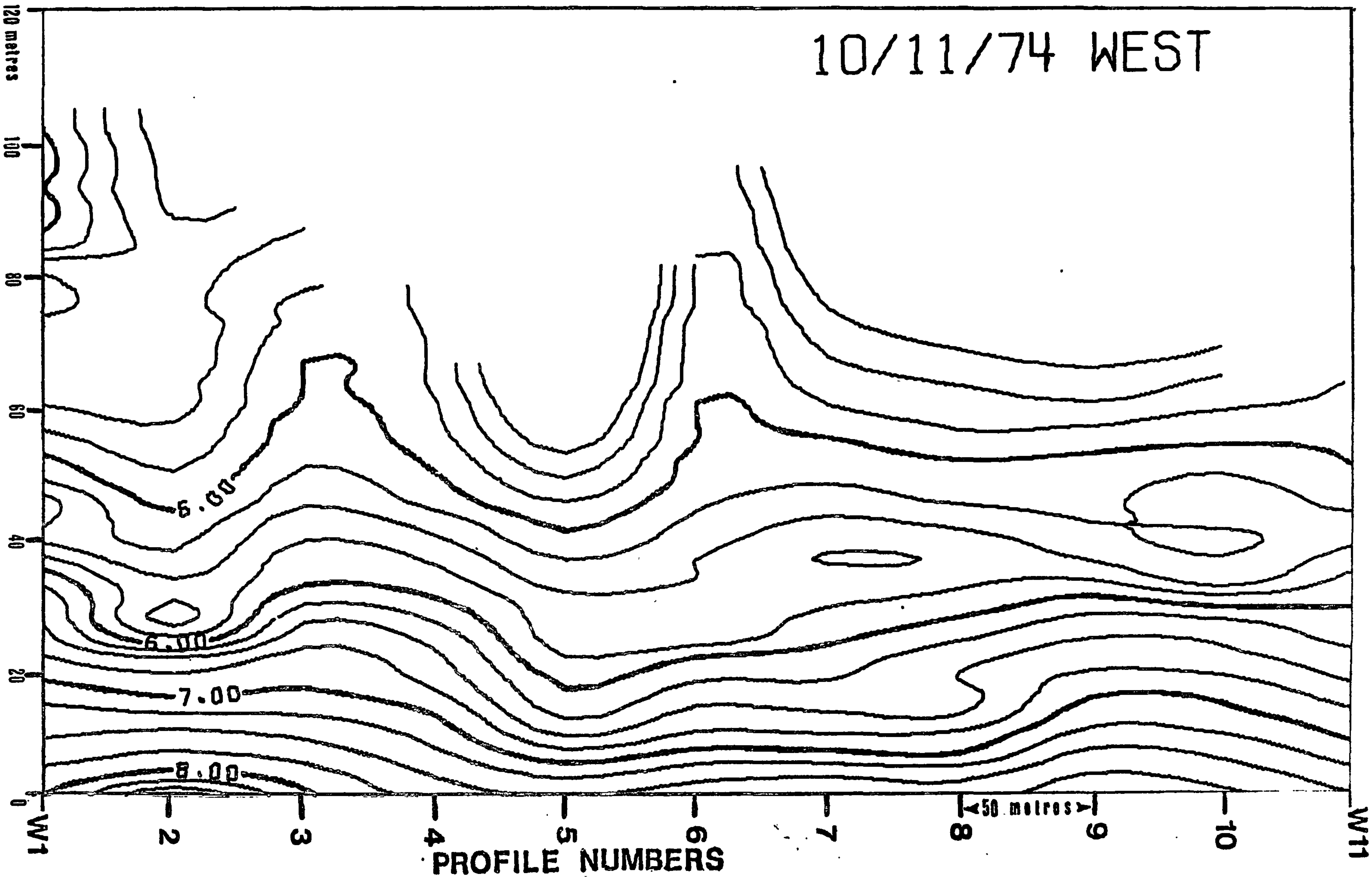
PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
3.00
2.00
0
20
40
60
80
100 metres
120
25/8/74 EAST


PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
4.00
3.00
2.00
2.00
0
20
40
60
80
100 metres
120
27/8/74 EAST

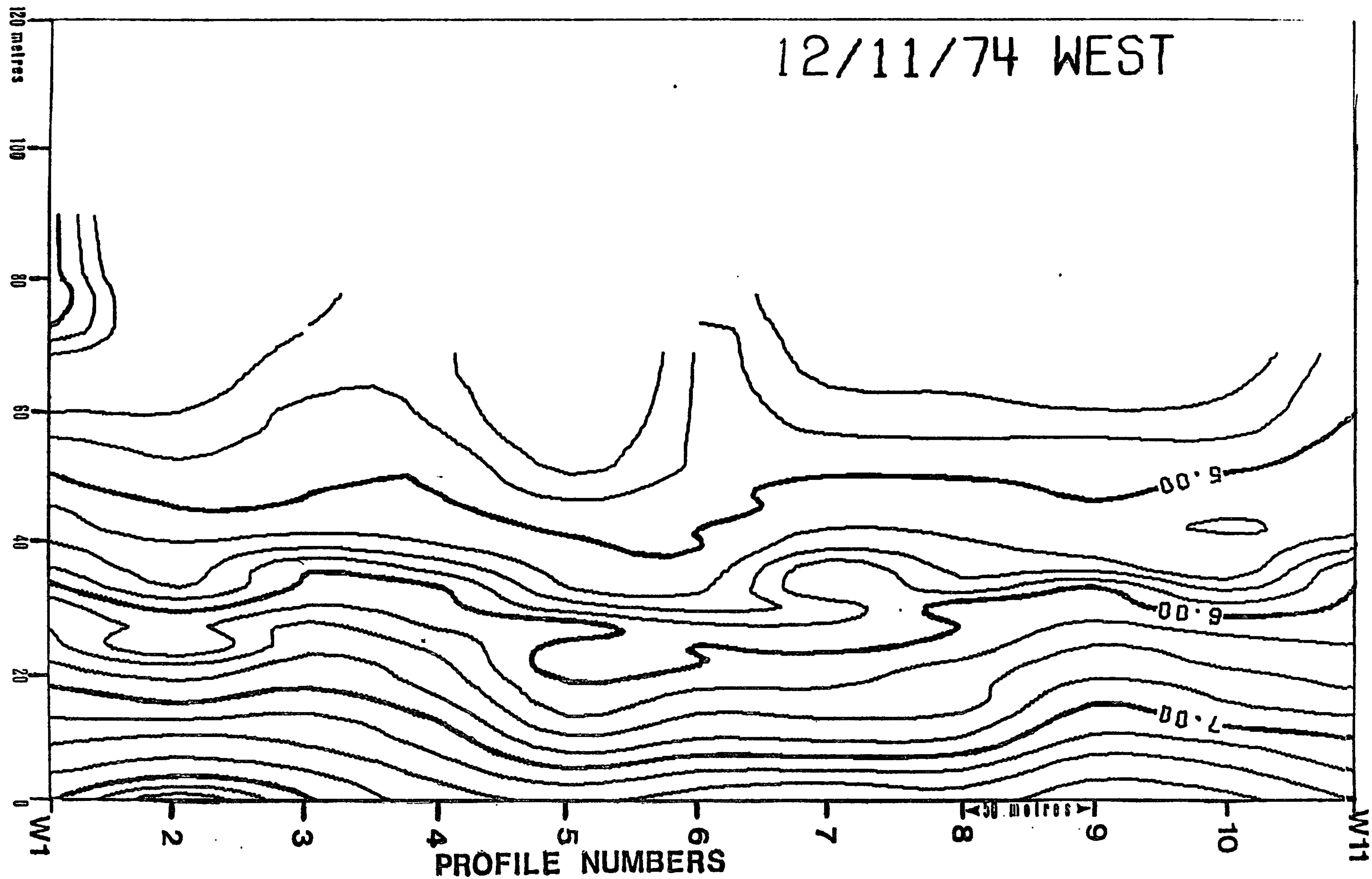
CONTOURED BEACH MAPS

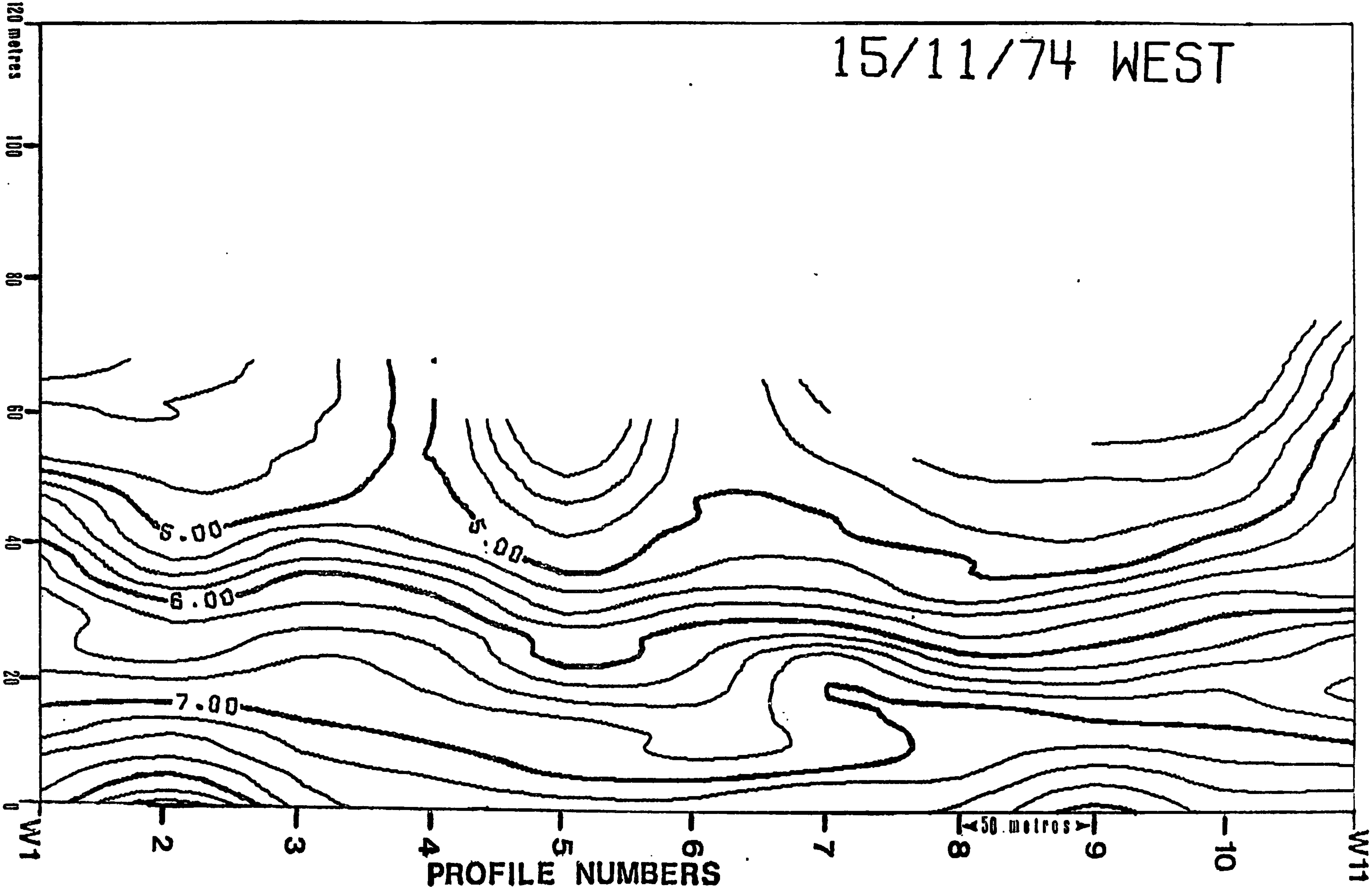
Winter west


08/11/74 WEST
120 metres
100
80
60
40
20
0
6.00
4.00
4.00
5.00
8.00
7.00
8.00
W1
2
3
4
5
6
7
8
50 metres
9
10
W11
PROFILE NUMBERS

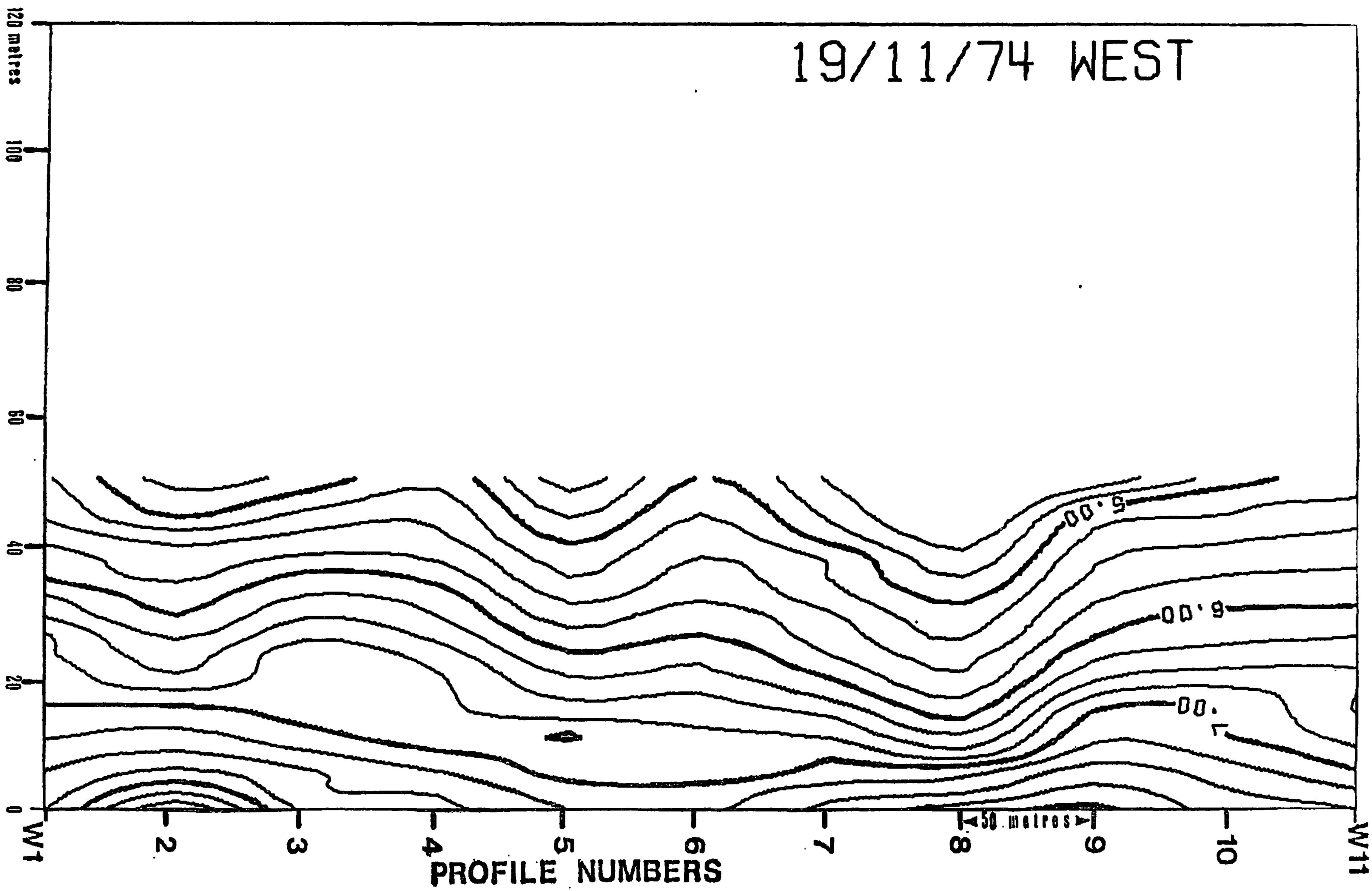


10/11/74 WEST
120 metres
100
80
60
40
20
0
6.00
6.00
7.00
8.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS

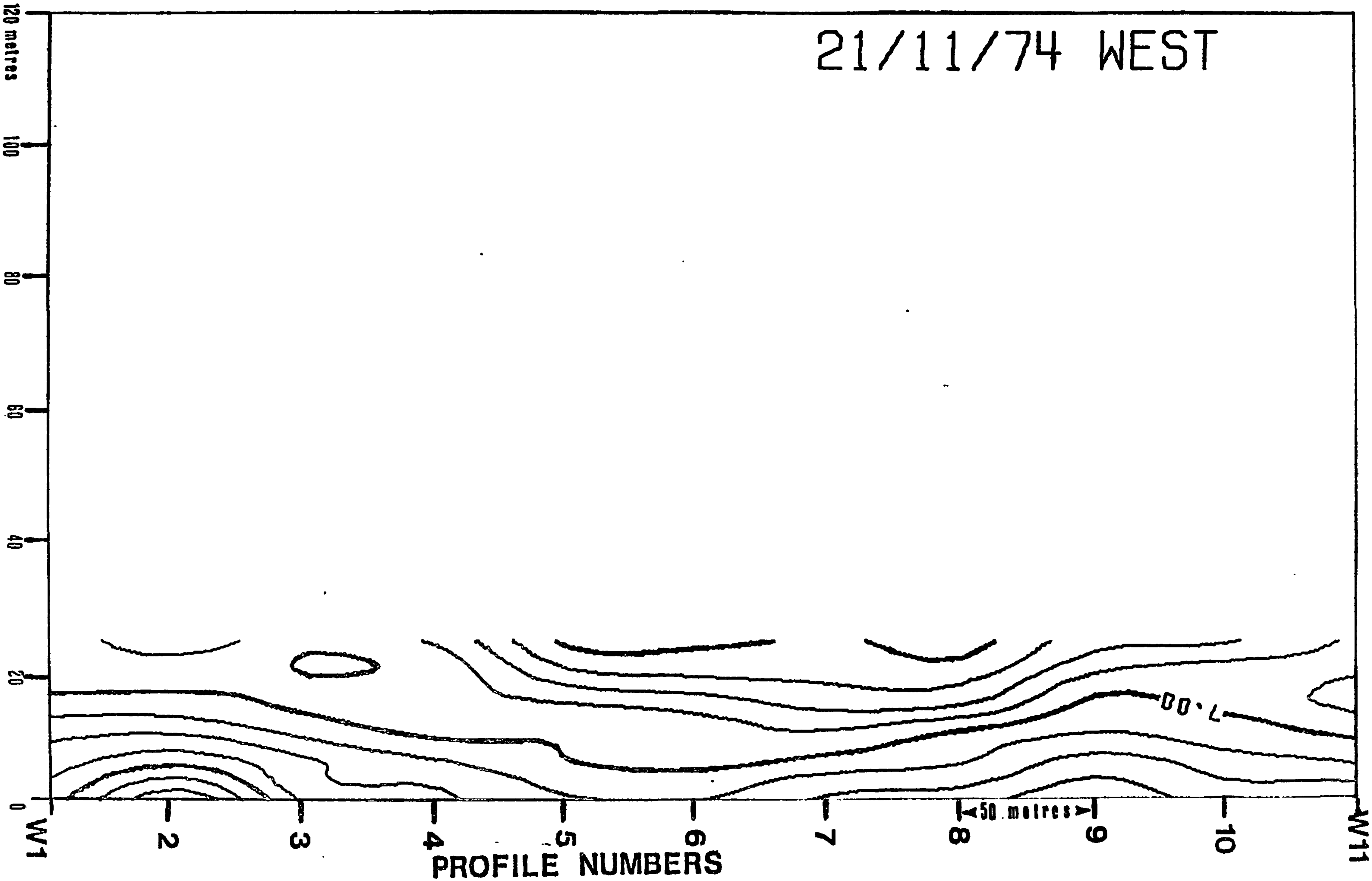

12/11/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
50 metres
W1
2
3
4
5
6
7
8
9
10
W11
PROFILE NUMBERS



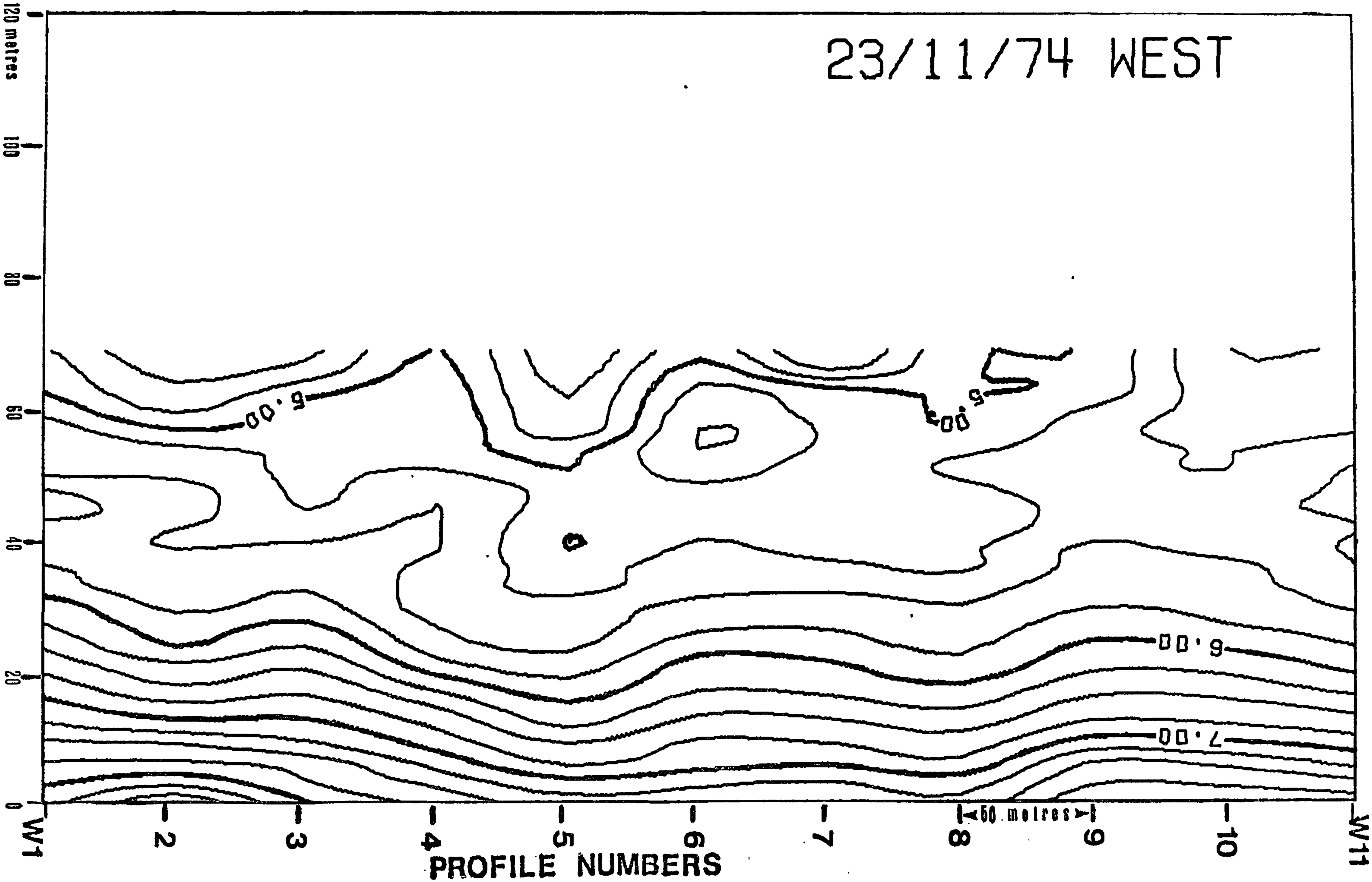
15/11/74 WEST
120 metres
100
80
60
40
20
0
5.00
5.00
6.00
7.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS



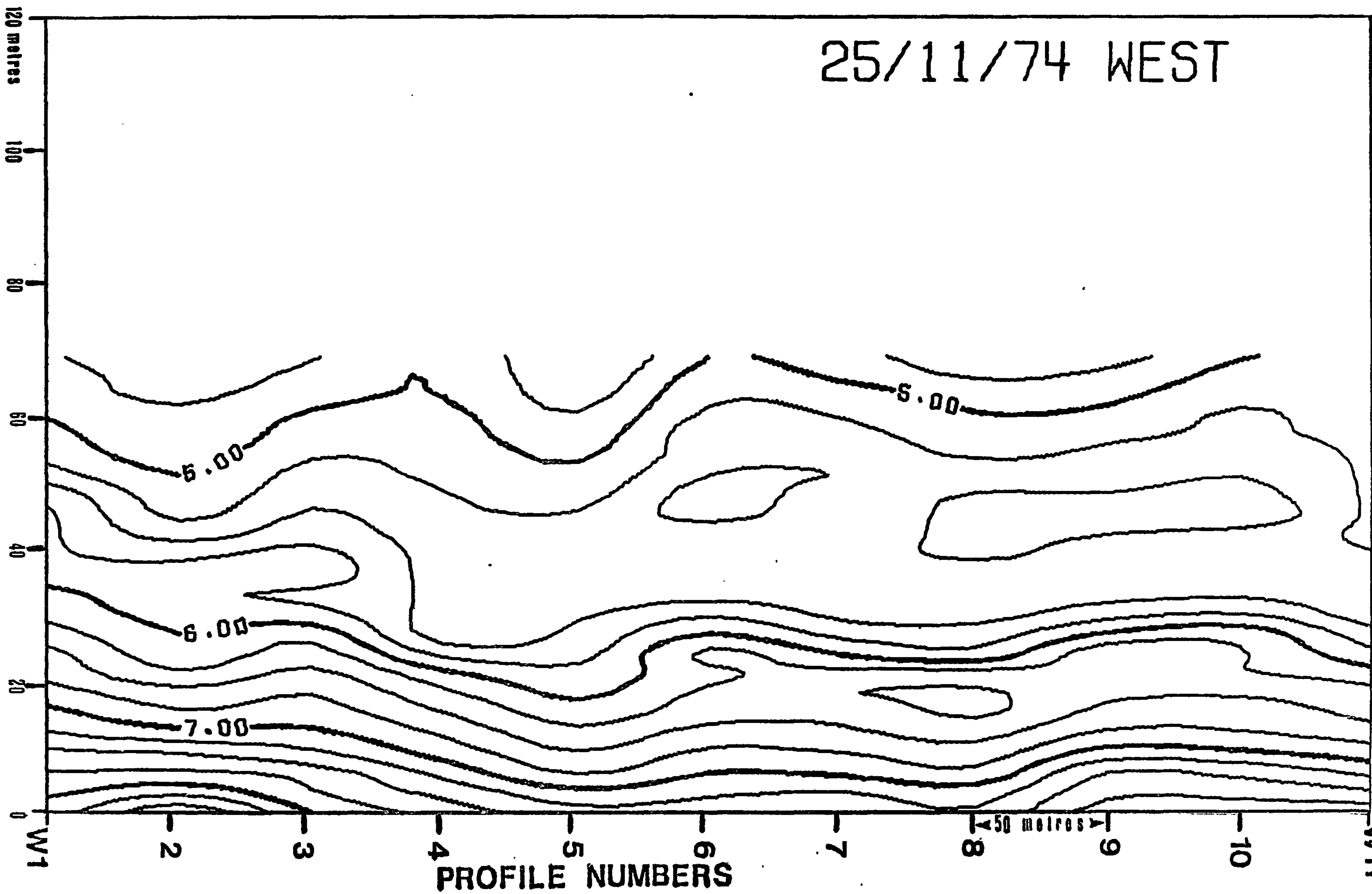
19/11/74 WEST
120 metres
100
80
60
40
20
0
5.00
6.00
7.00
50 metres
W1
2
3
4
5
6
7
8
9
10
W11
PROFILE NUMBERS



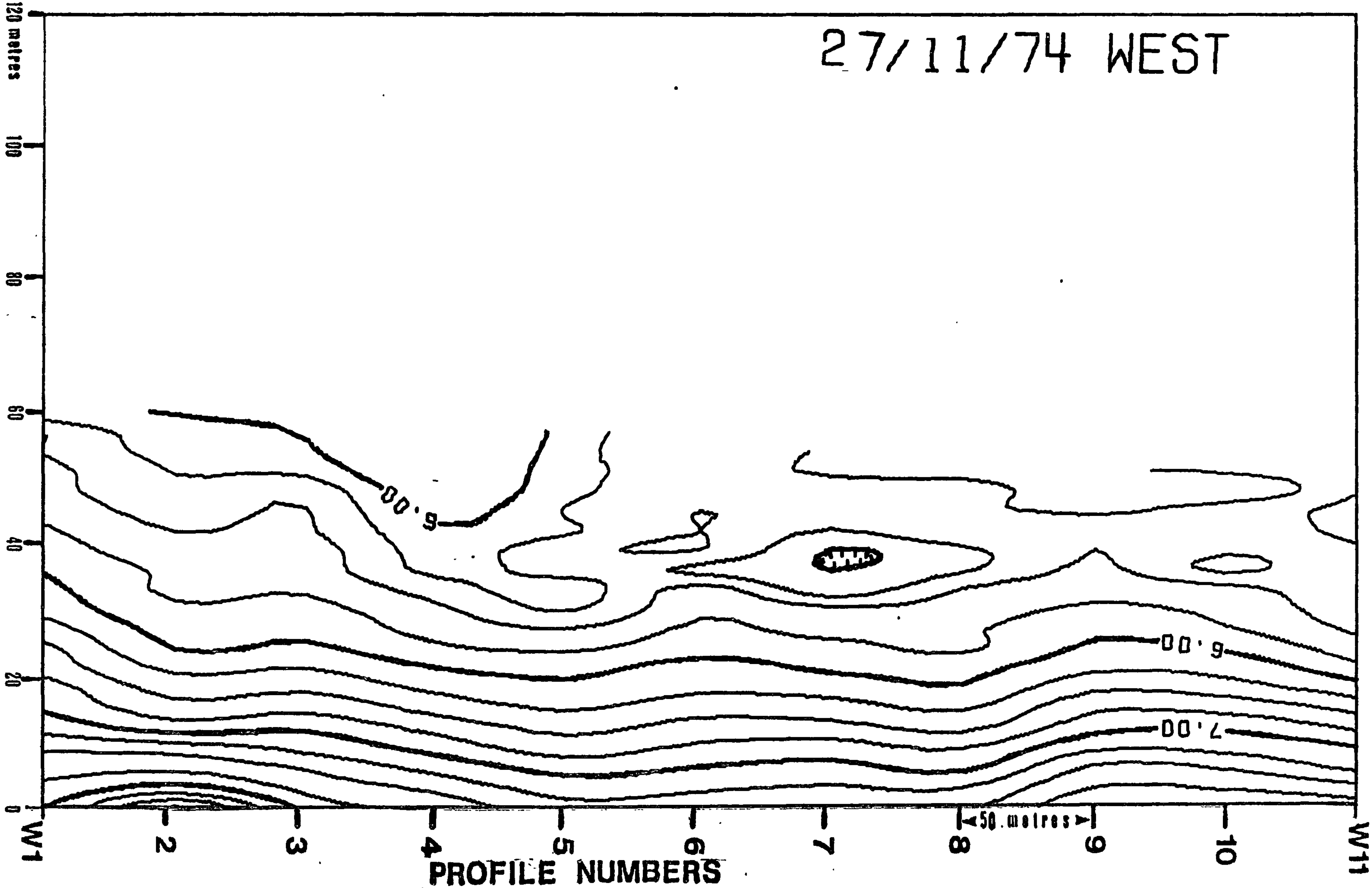
21/11/74 WEST
120 metres
100
80
60
40
20
0
7.00
50 metres
W1
2
3
4
5
6
7
8
9
10
W11
PROFILE NUMBERS

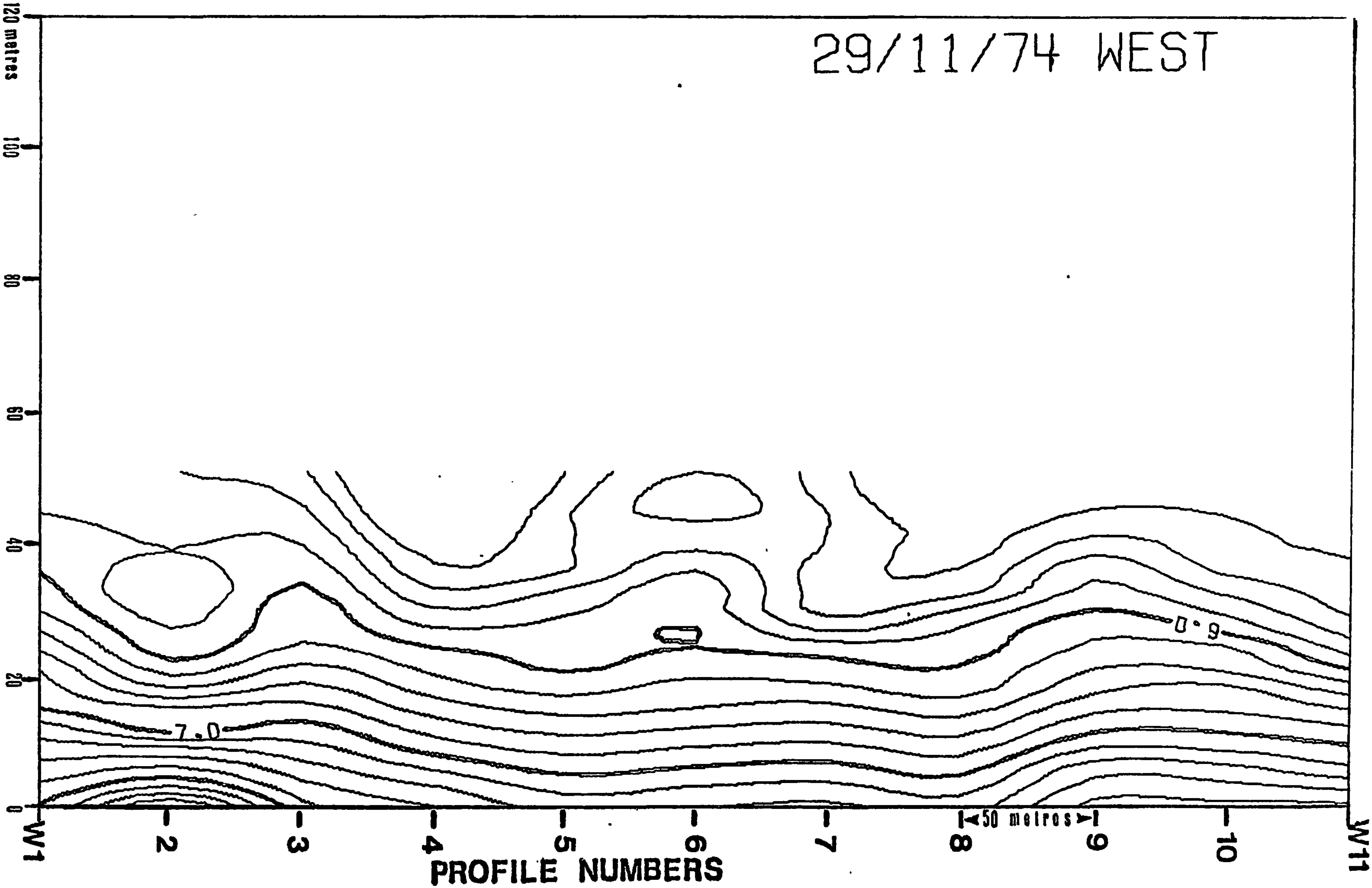


23/11/74 WEST
120 metres
100
80
60
40
20
0
6.00
5.00
5.00
6.00
7.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS



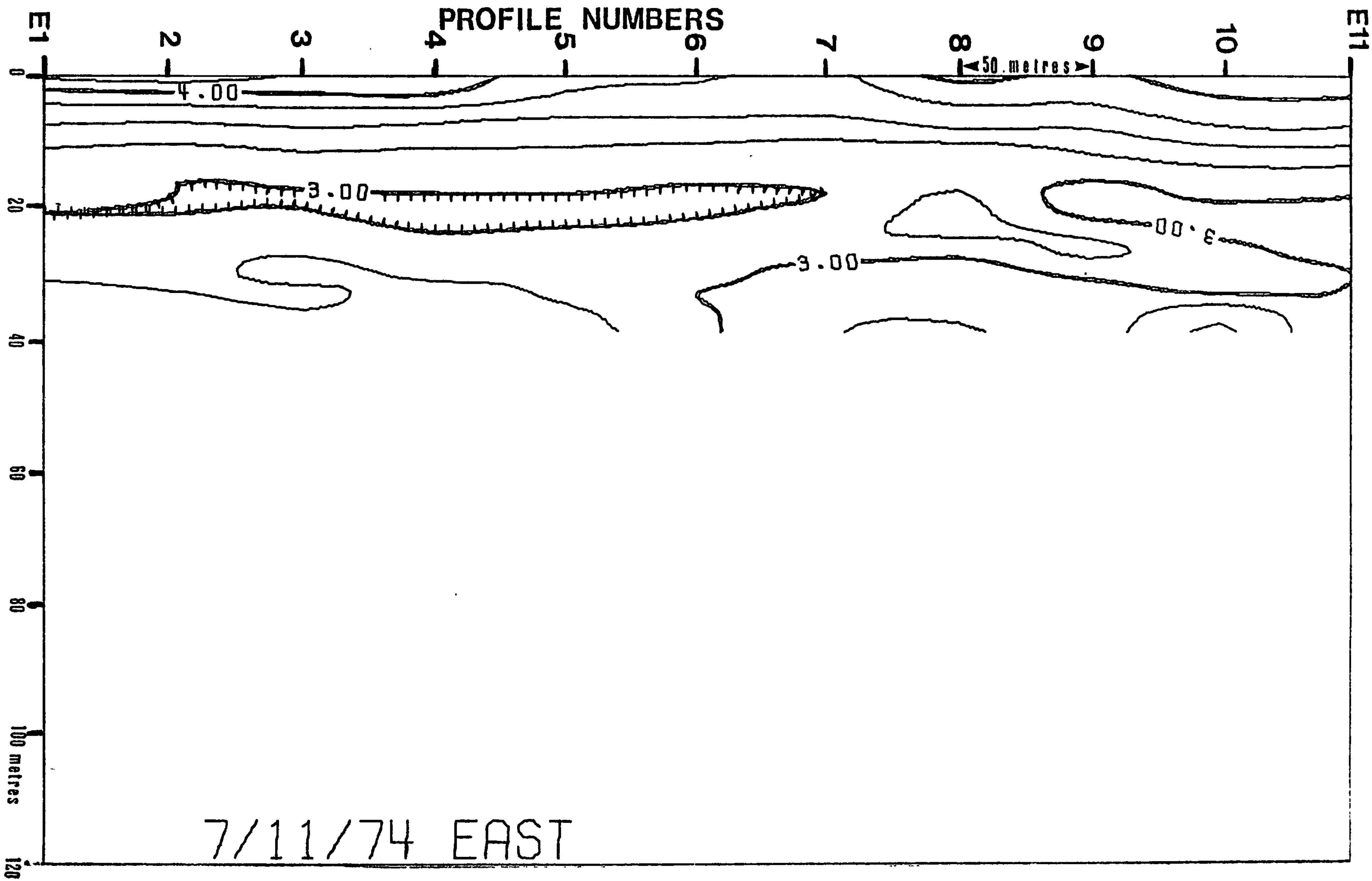
25/11/74 WEST
120 metres
100
80
60
40
20
0
5.00
5.00
6.00
7.00
50 metres
W1
2
3
4
5
6
7
8
9
10
W11
PROFILE NUMBERS

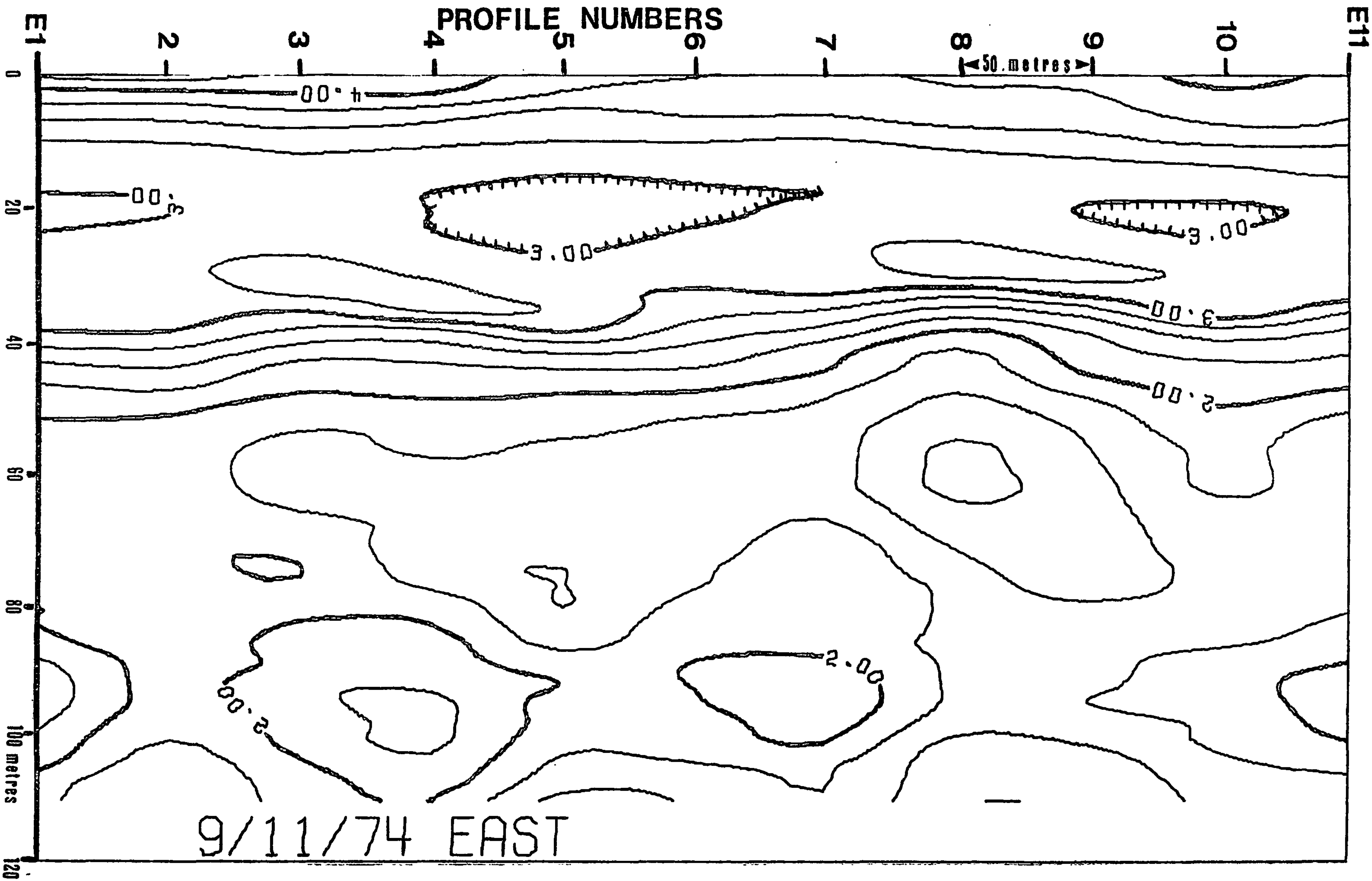

27/11/74 WEST
120 metres
100
80
60
40
20
0
6.00
7.00
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS

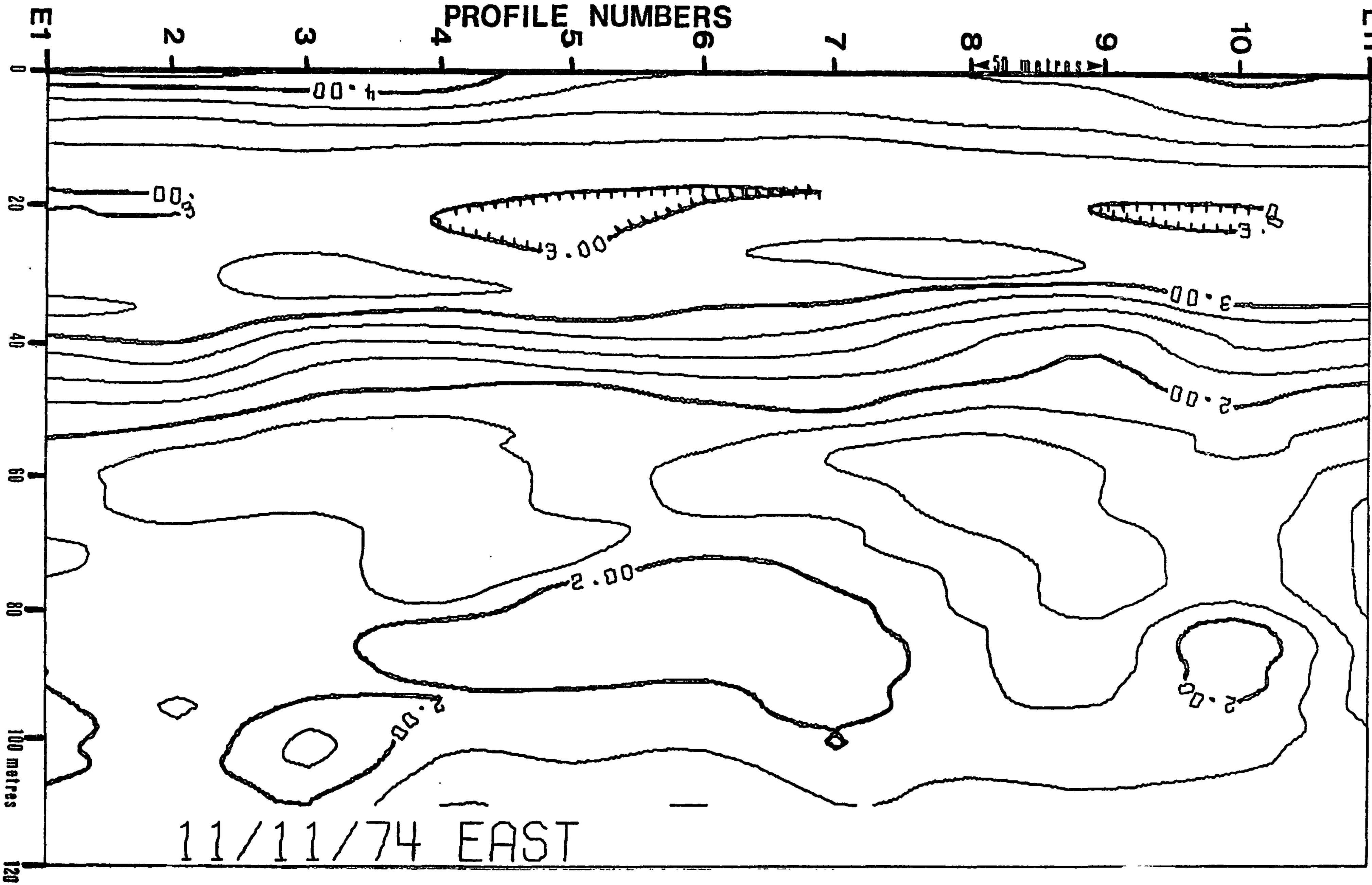

29/11/74 WEST
120 metres
100
80
60
40
20
0
6.0
7.0
W1
2
3
4
5
6
7
8
9
10
W11
50 metres
PROFILE NUMBERS

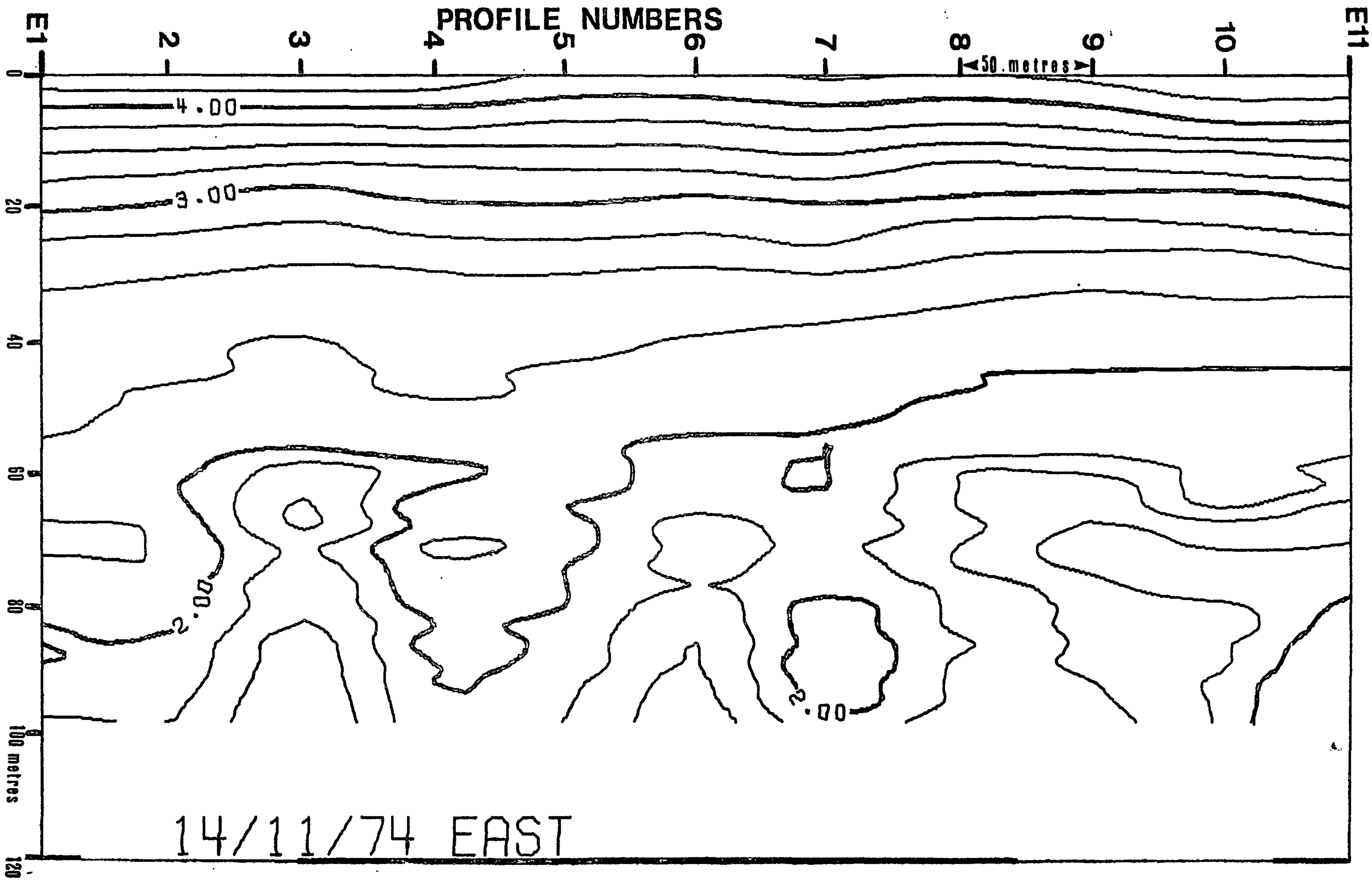
CONTOURED BEACH MAPS

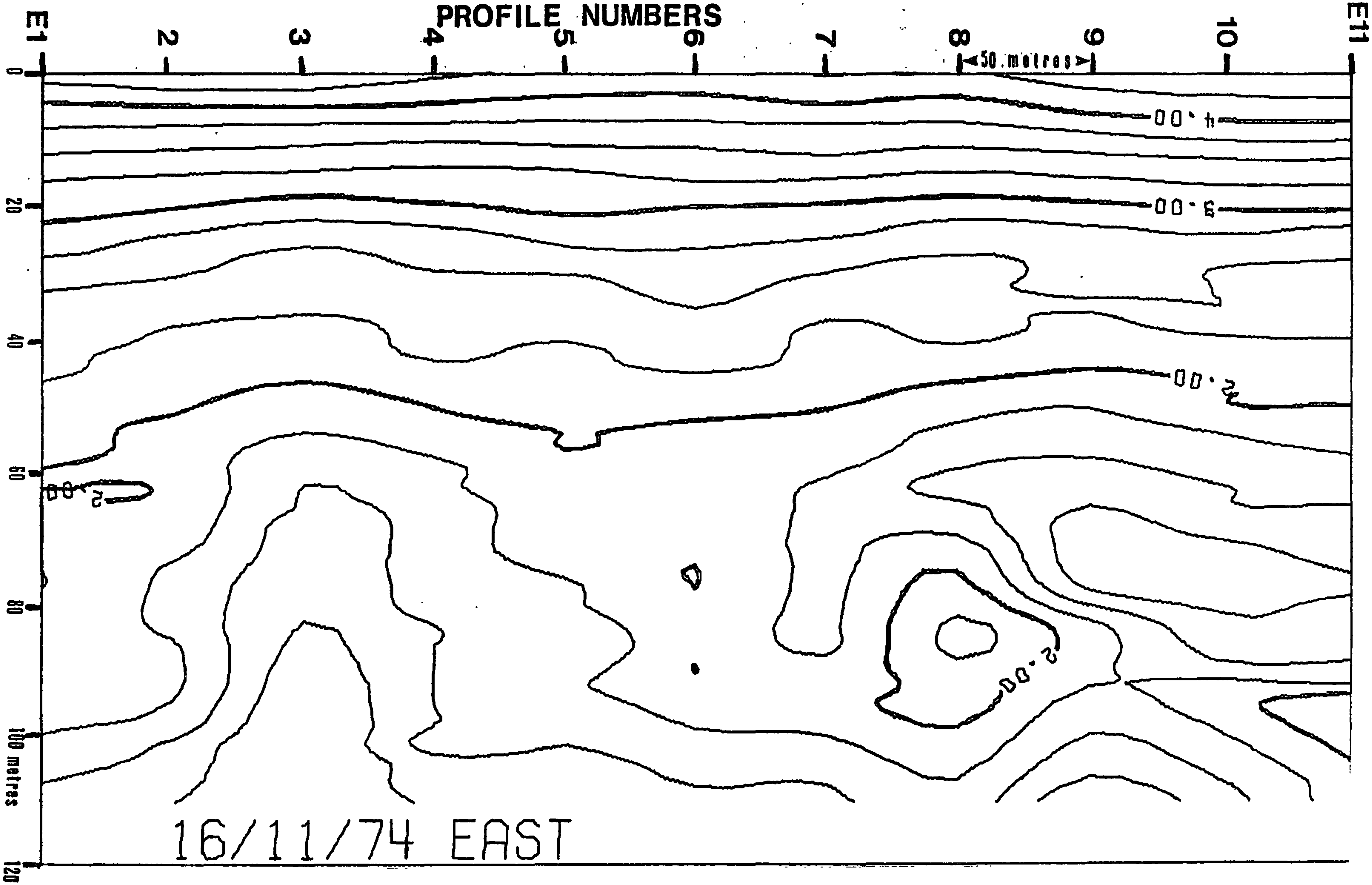
Winter east

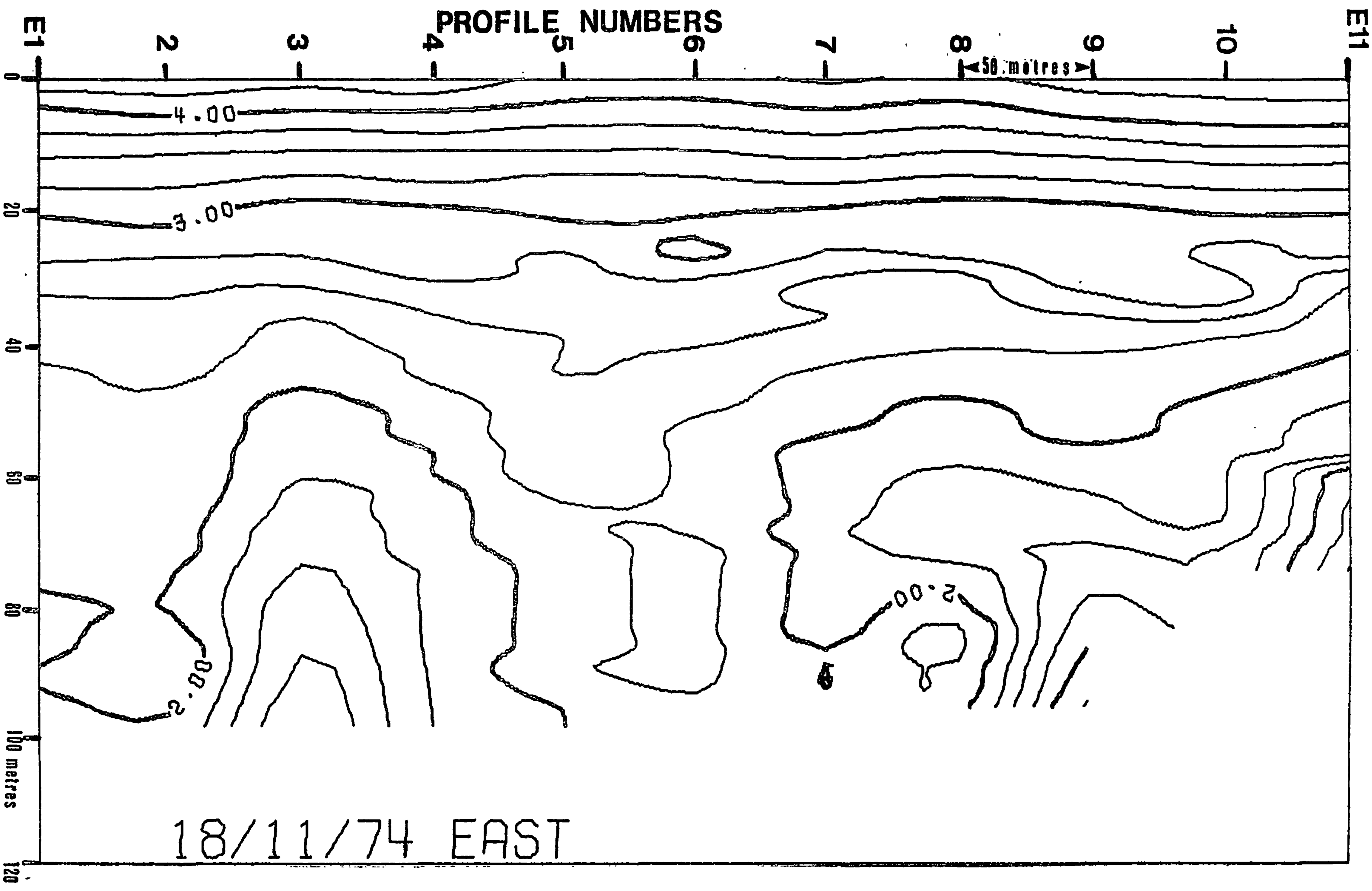

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
3.00
3.00
0
20
40
60
80
100 metres
120
7/11/74 EAST


PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
3.00
3.00
3.00
2.00
2.00
2.00
0
20
40
60
80
100 metres
120
9/11/74 EAST

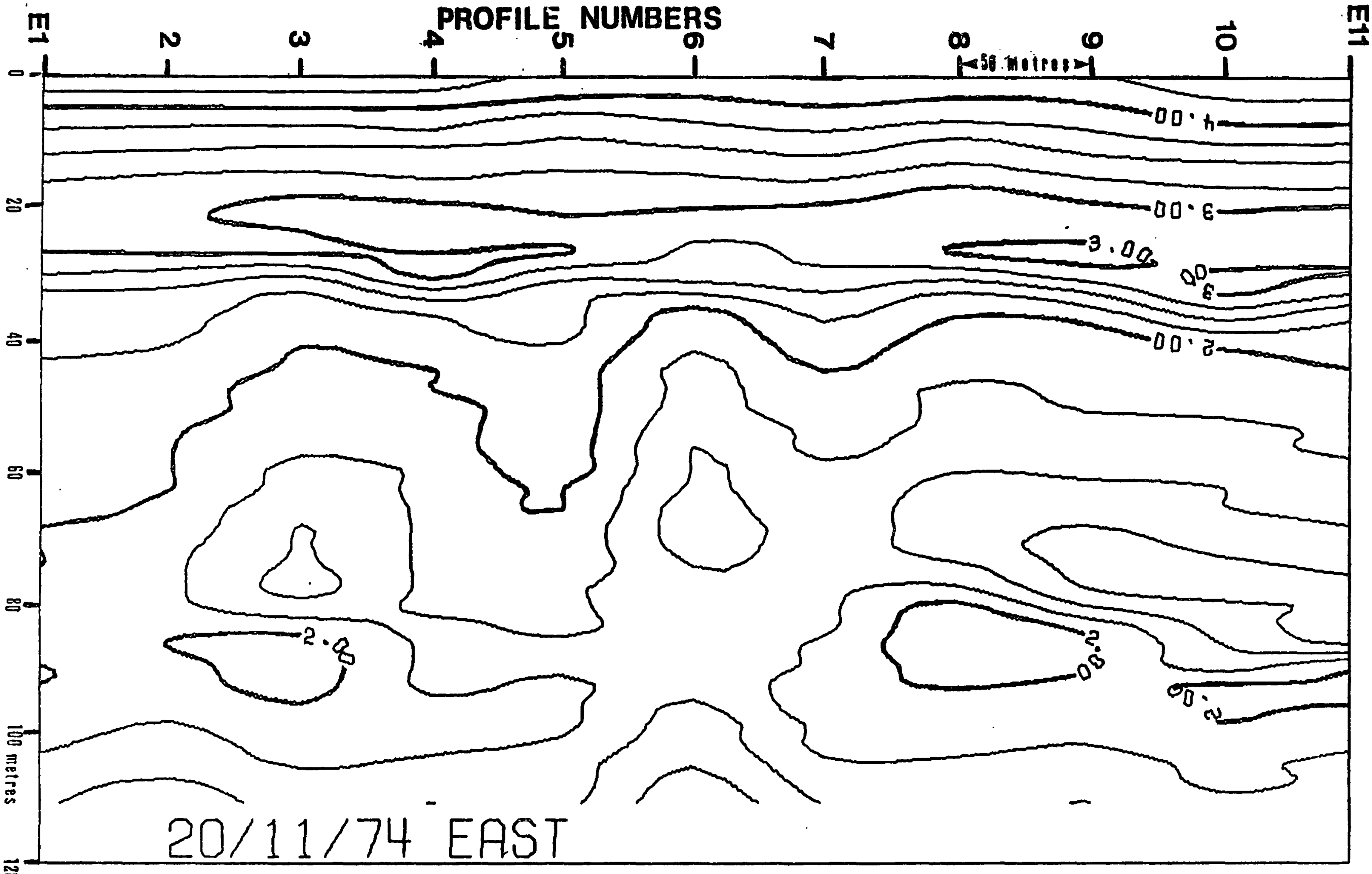

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
3.00
3.00
2.00
2.00
2.00
2.00
0
20
40
60
80
100 metres
120
11/11/74 EAST

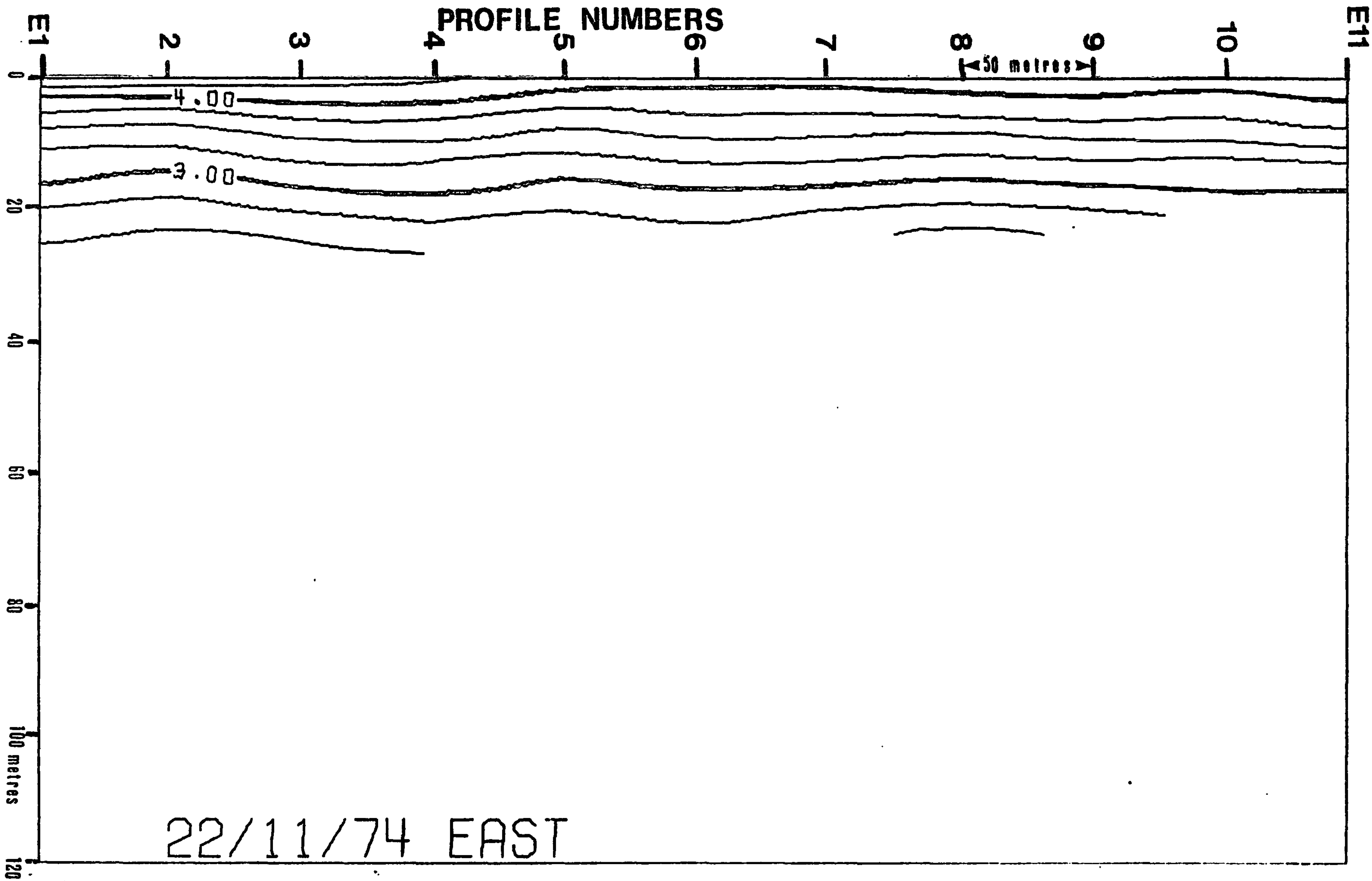

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
2.00
2.00
0
20
40
60
80
100 metres
120
14/11/74 EAST

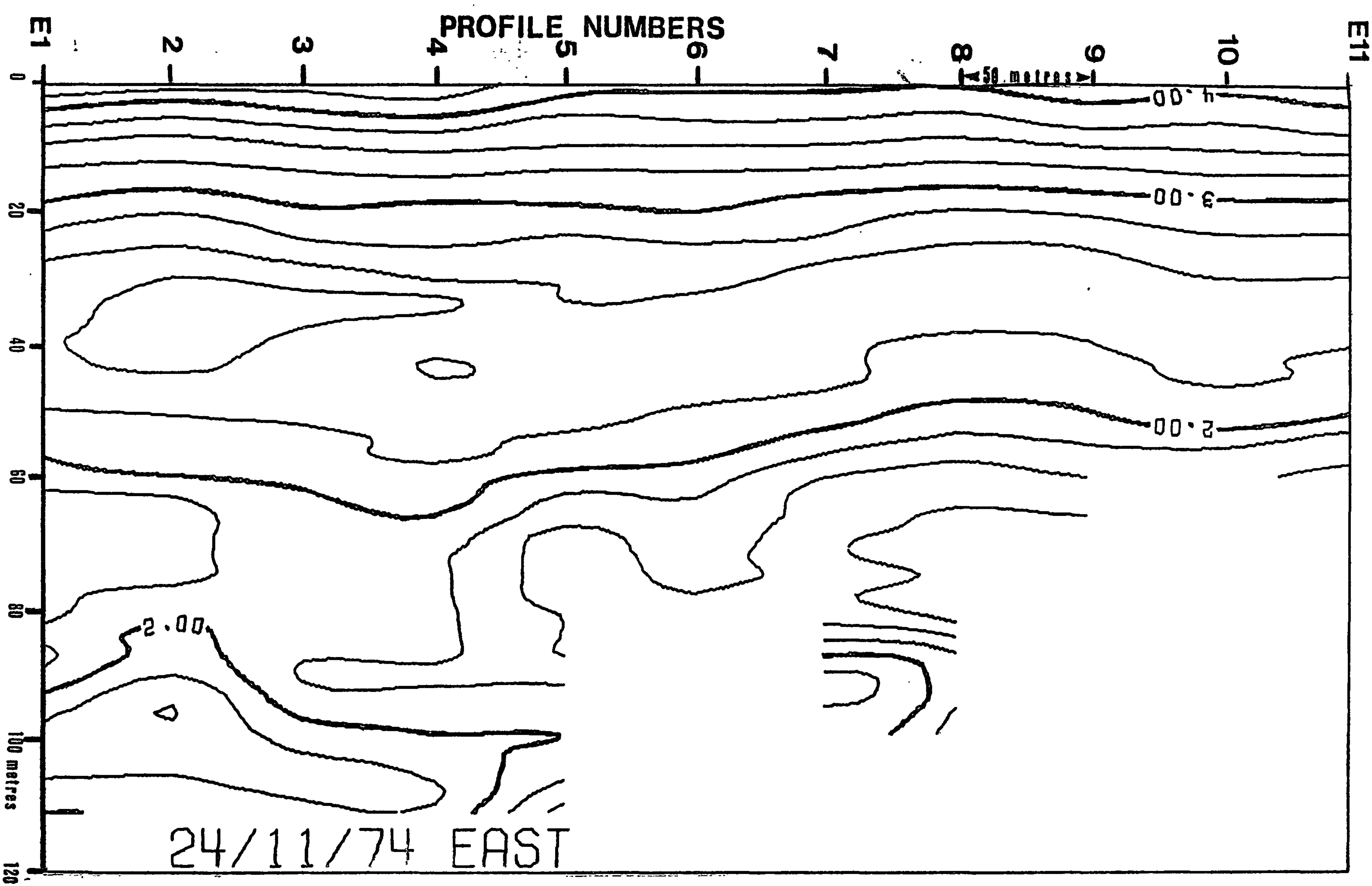

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
0
20
40
60
80
100 metres
120
4.00
3.00
2.00
16/11/74 EAST

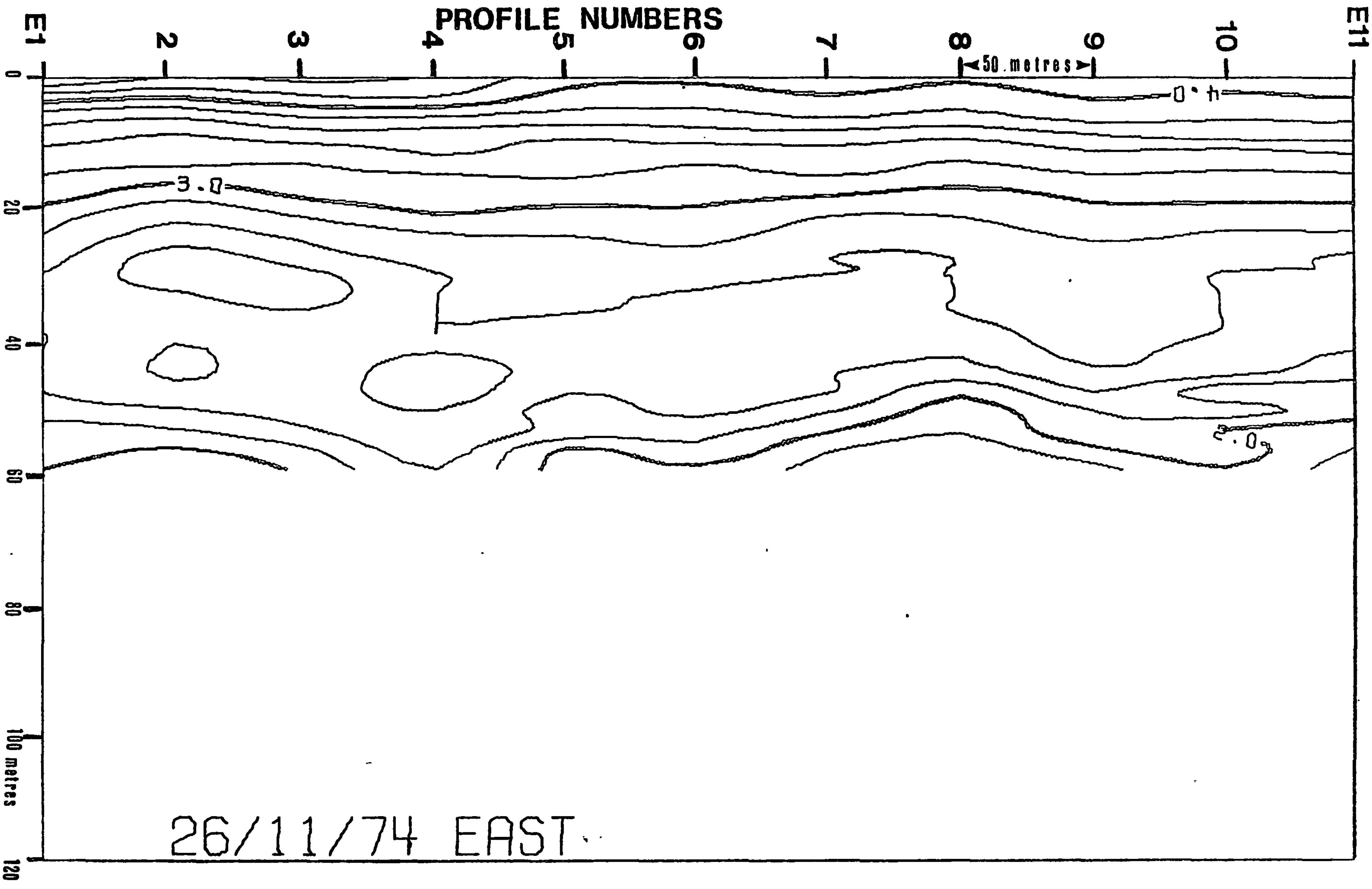


PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
2.00
2.00
2.00
0
20
40
60
80
100 metres
120
18/11/74 EAST

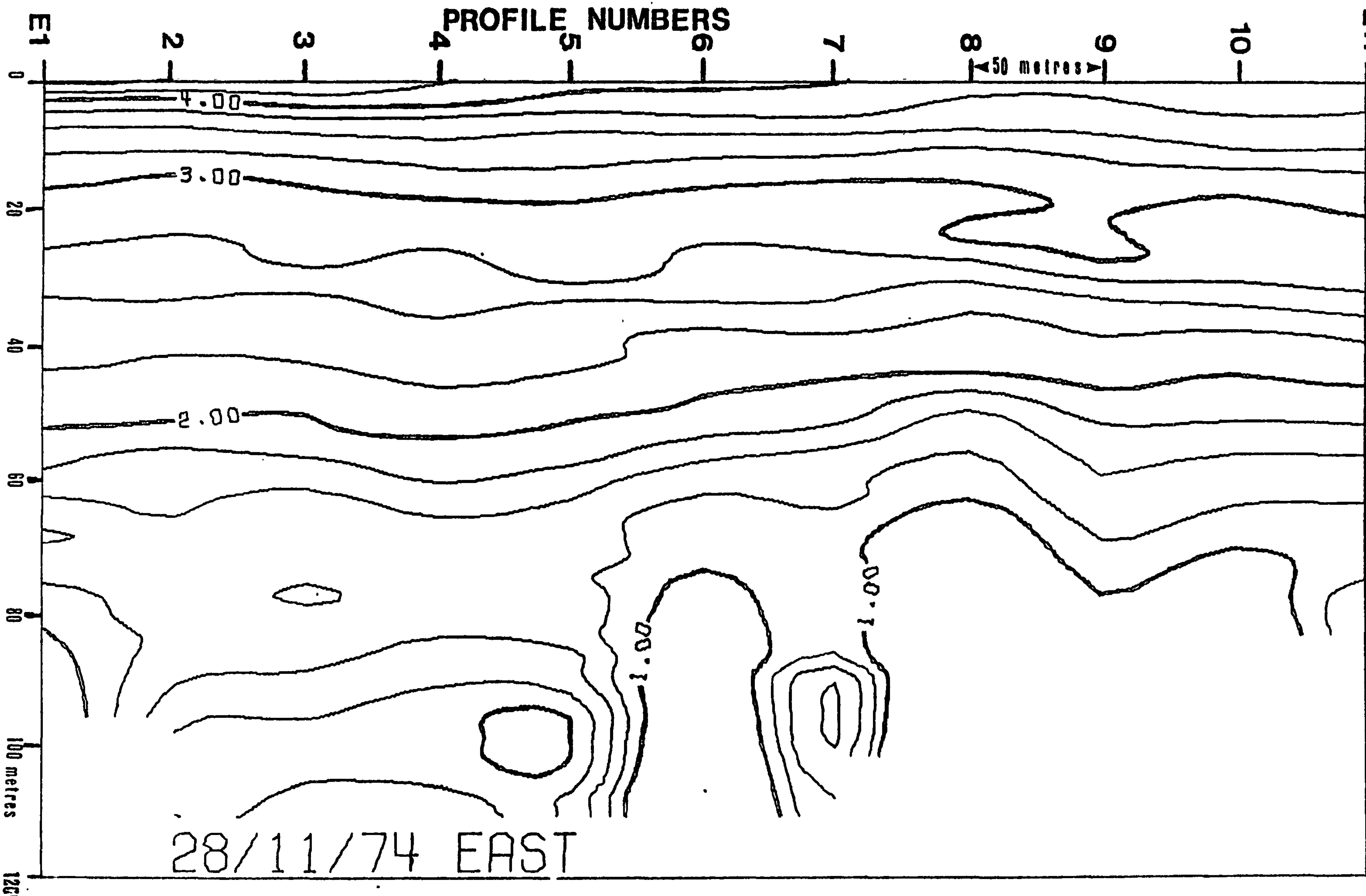

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
0
20
40
60
80
100 metres
120
4.00
3.00
3.00
3.00
2.00
2.00
2.00
2.00
20/11/74 EAST


PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
0
20
40
60
80
100 metres
120
22/11/74 EAST

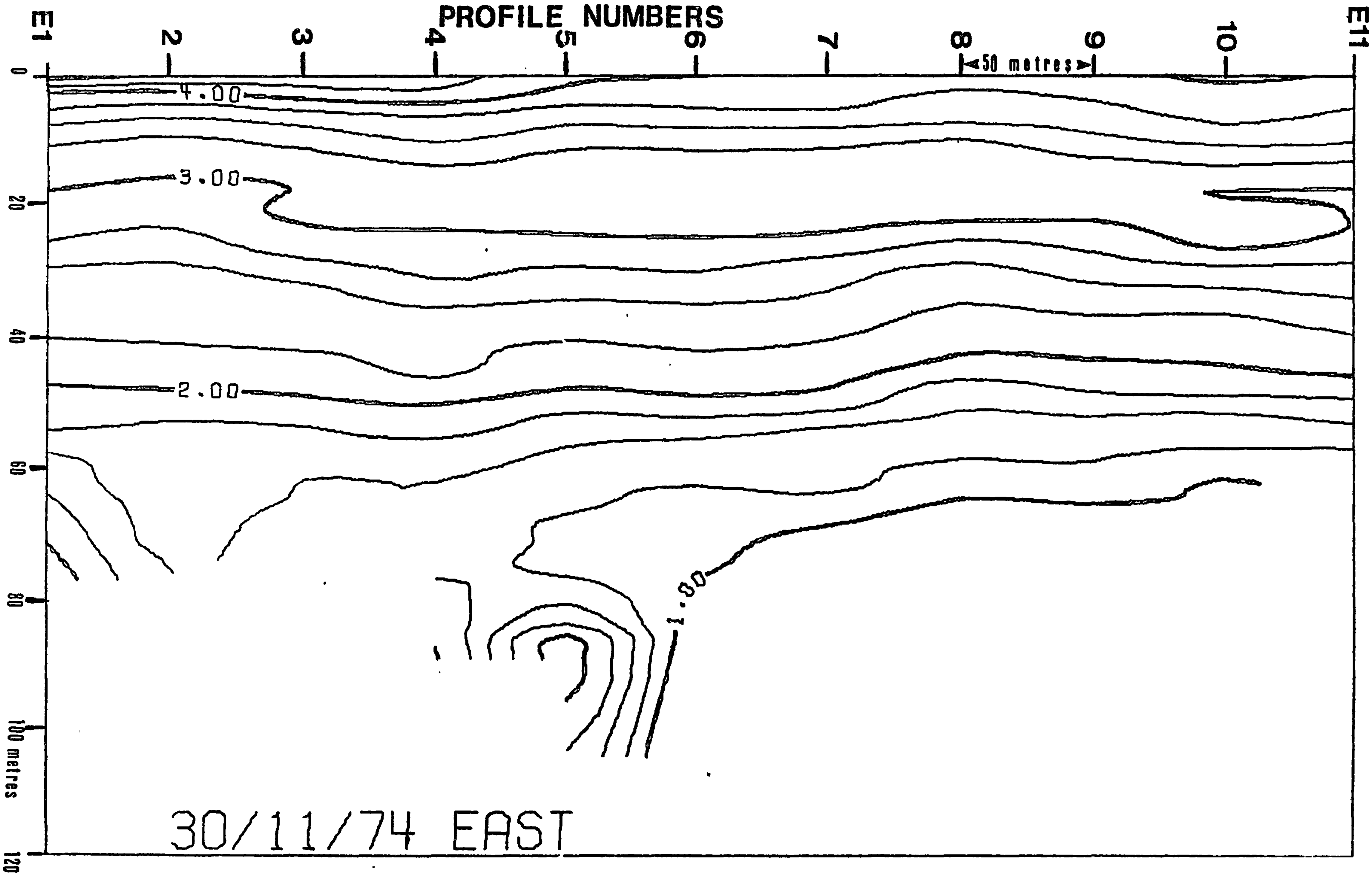

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.00
3.00
2.00
2.00
0
20
40
60
80
100 metres
120
24/11/74 EAST



PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
4.0
3.0
3.0
0
20
40
60
80
100 metres
120
26/11/74 EAST



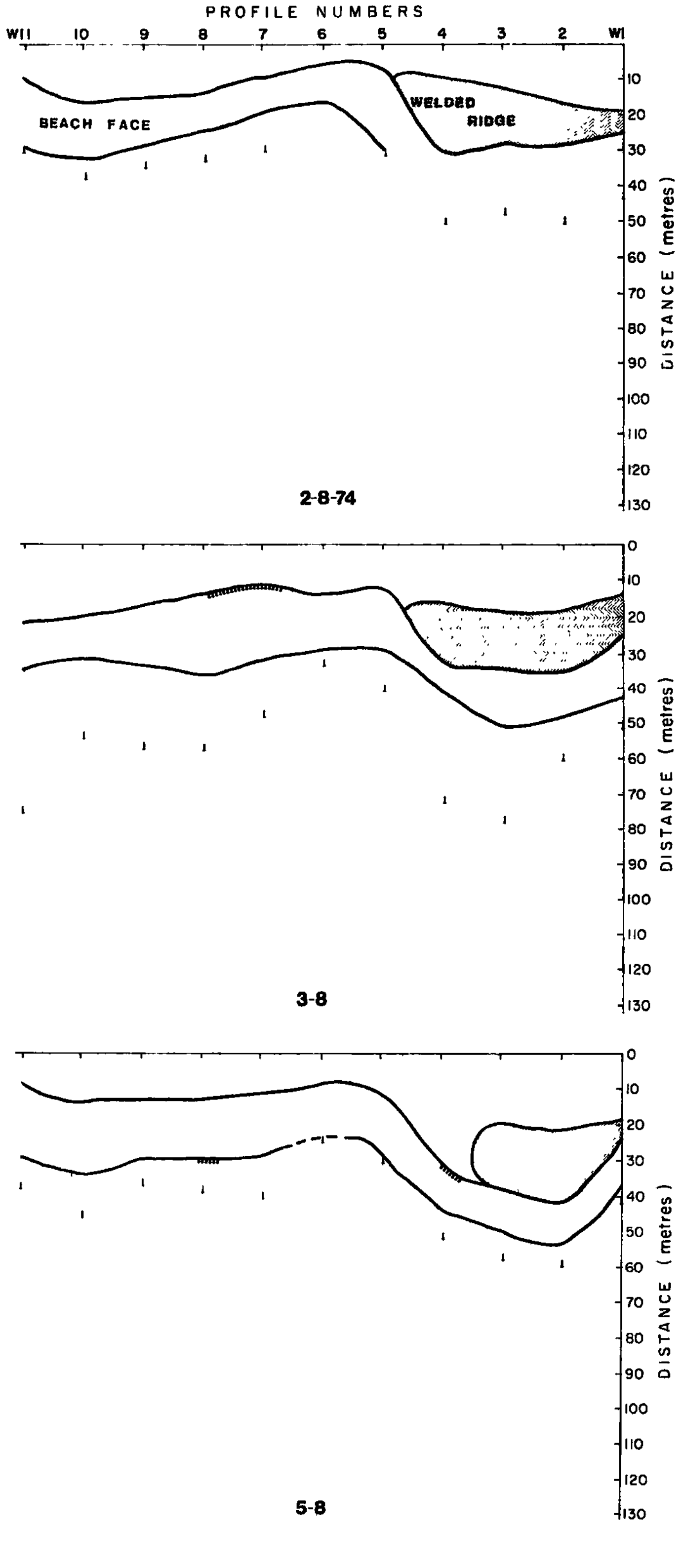
PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
0
20
40
60
80
100 metres
120
4.00
3.00
2.00
1.00
1.00
28/11/74 EAST

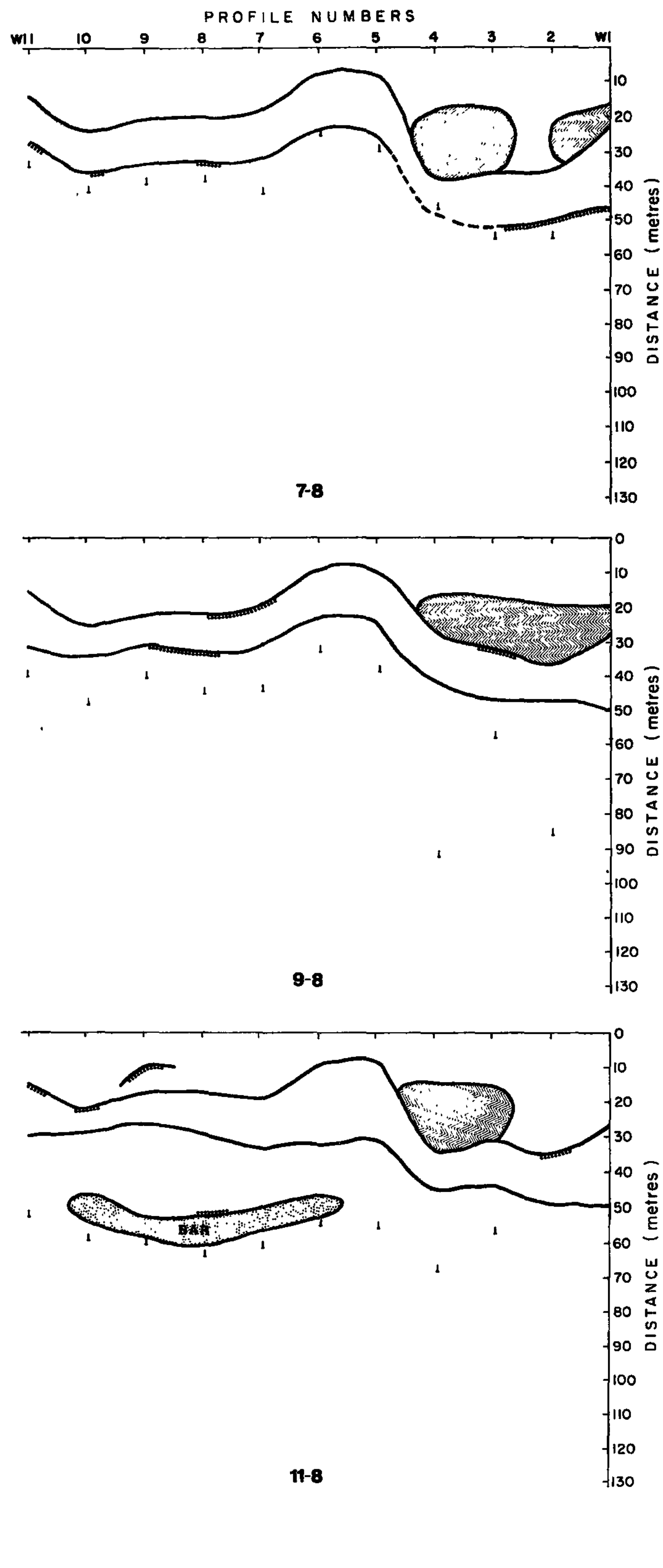


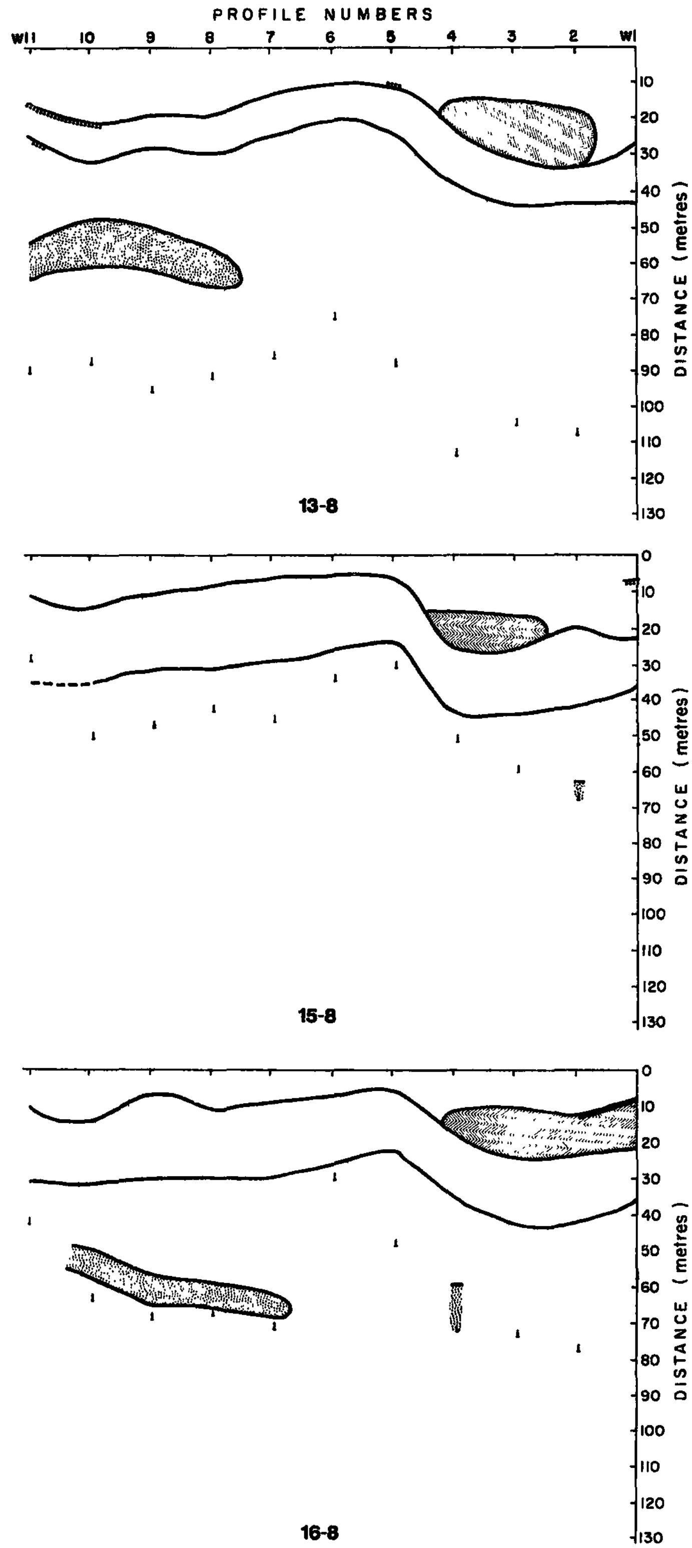
PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
50 metres
0
20
40
60
80
100 metres
120
4.00
3.00
2.00
1.00
30/11/74 EAST

MORPHOLOGIC MAPS

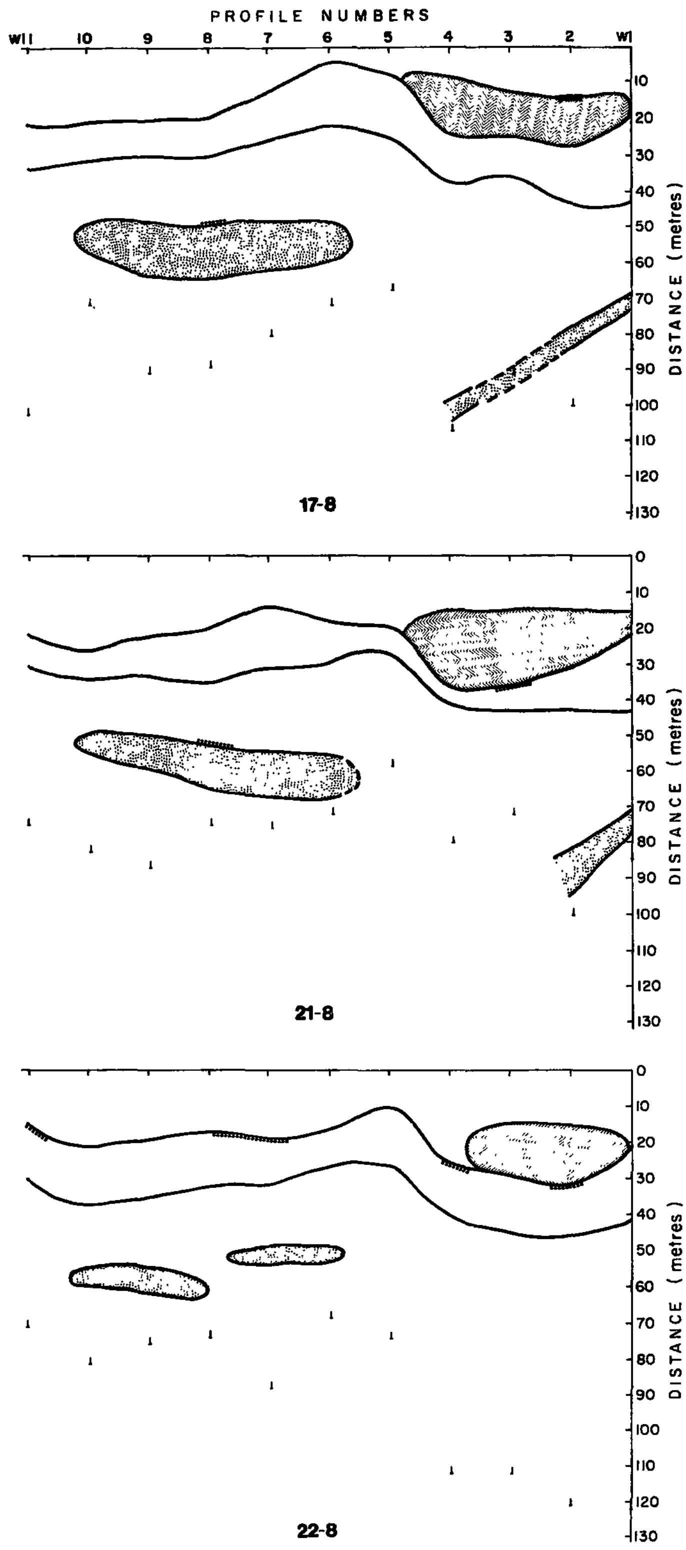
Summer west


PROFILE NUMBERS
W11 10 9 8 7 6 5 4 3 2 W1
BEACH FACE
WELDED RIDGE
DISTANCE (metres)
0 10 20 30 40 50 60 70 80 90 100 110 120 130
2-8-74
3-8
5-8


PROFILE NUMBERS
W11 10 9 8 7 6 5 4 3 2 W1
DISTANCE (metres)
7-8
9-8
BAR
11-8

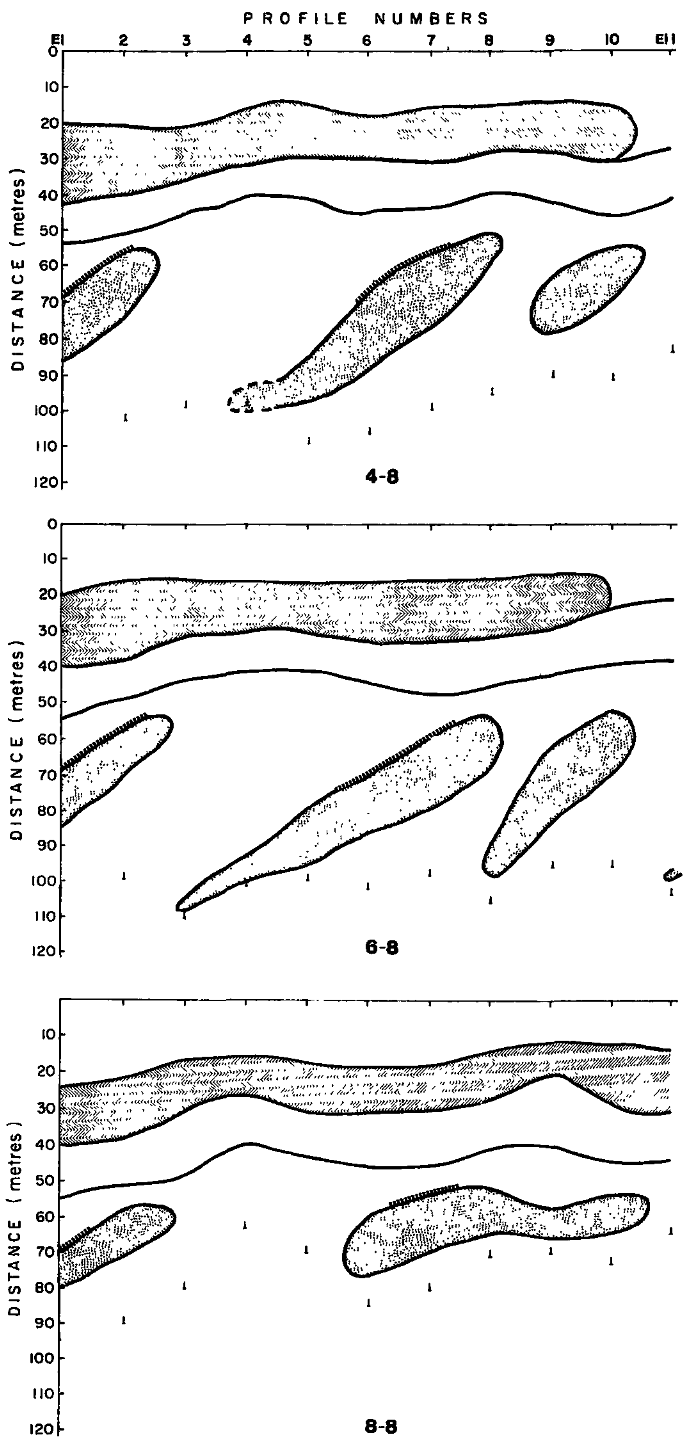


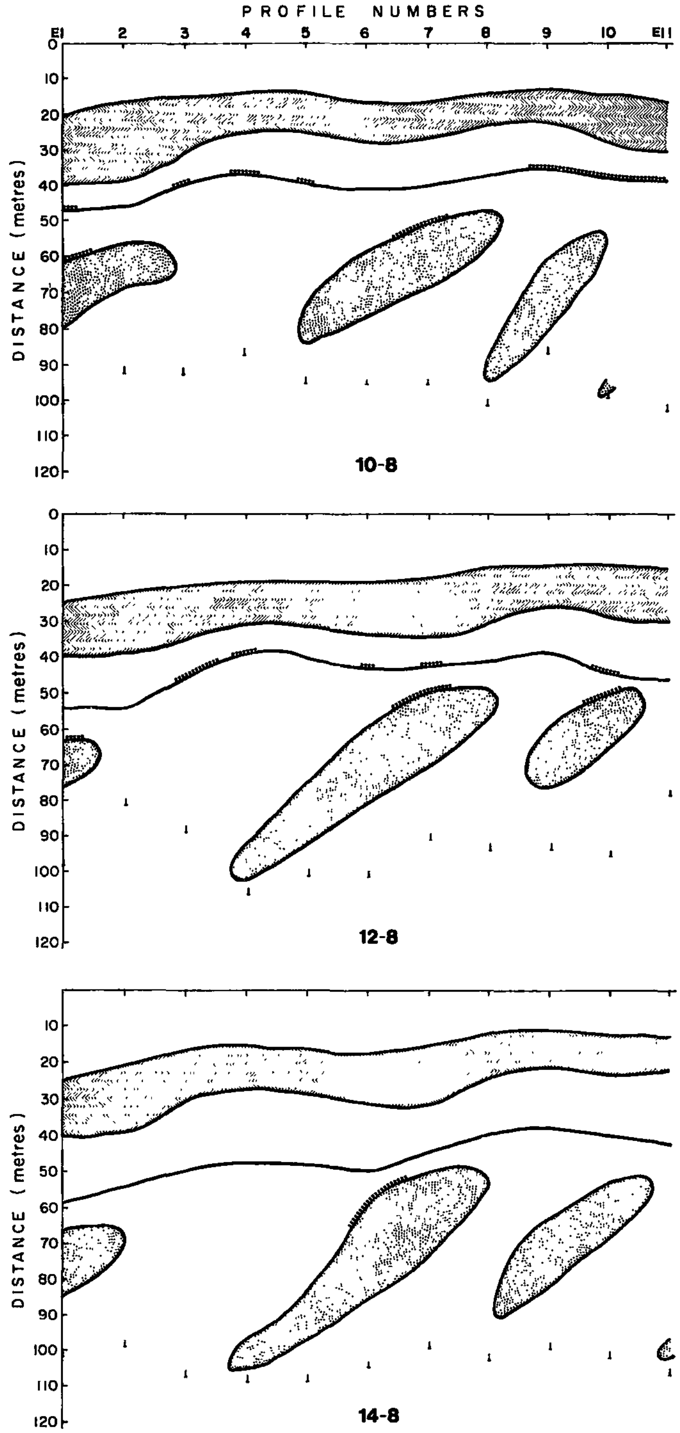
PROFILE NUMBERS
W11 10 9 8 7 6 5 4 3 2 W1
DISTANCE (metres)
13-8
15-8
16-8

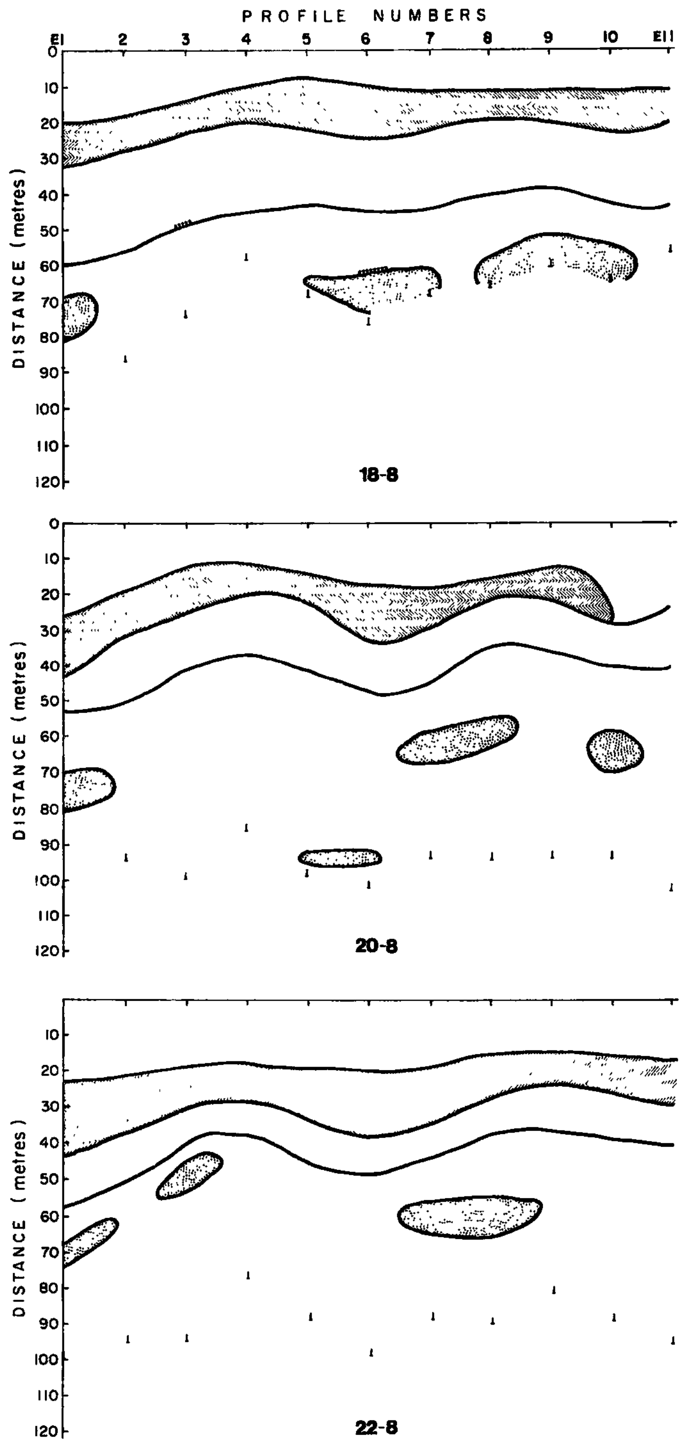

PROFILE NUMBERS
W11 10 9 8 7 6 5 4 3 2 W1
DISTANCE (metres)
17-8
21-8
22-8

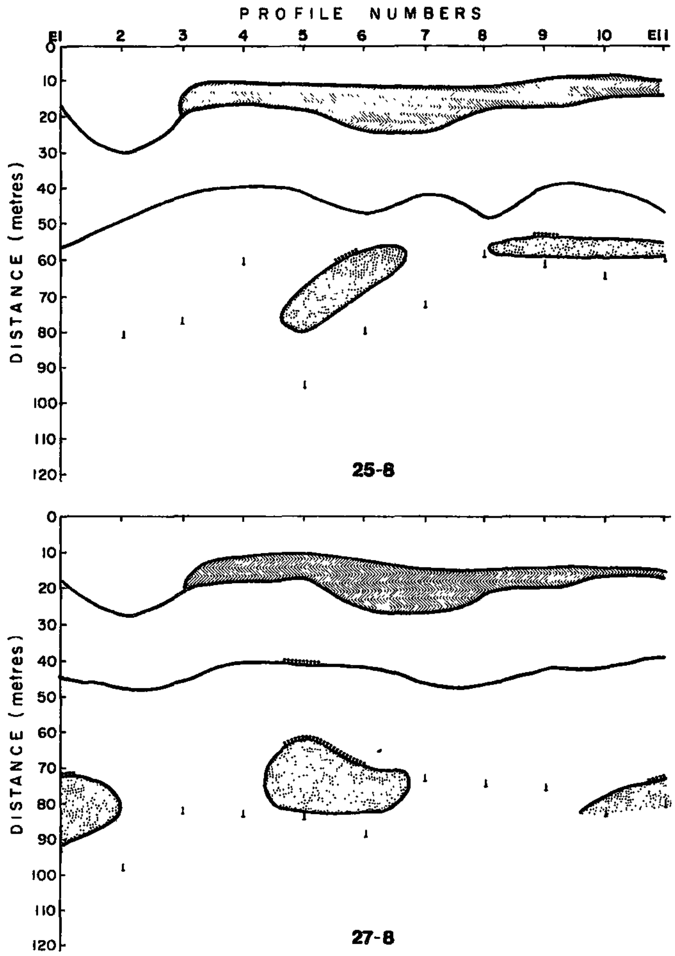
MORPHOLOGIC MAPS

Summer east


PROFILE NUMBERS
EI 2 3 4 5 6 7 8 9 10 EII
DISTANCE (metres)
0 10 20 30 40 50 60 70 80 90 100 110 120
4-8
6-8
8-8

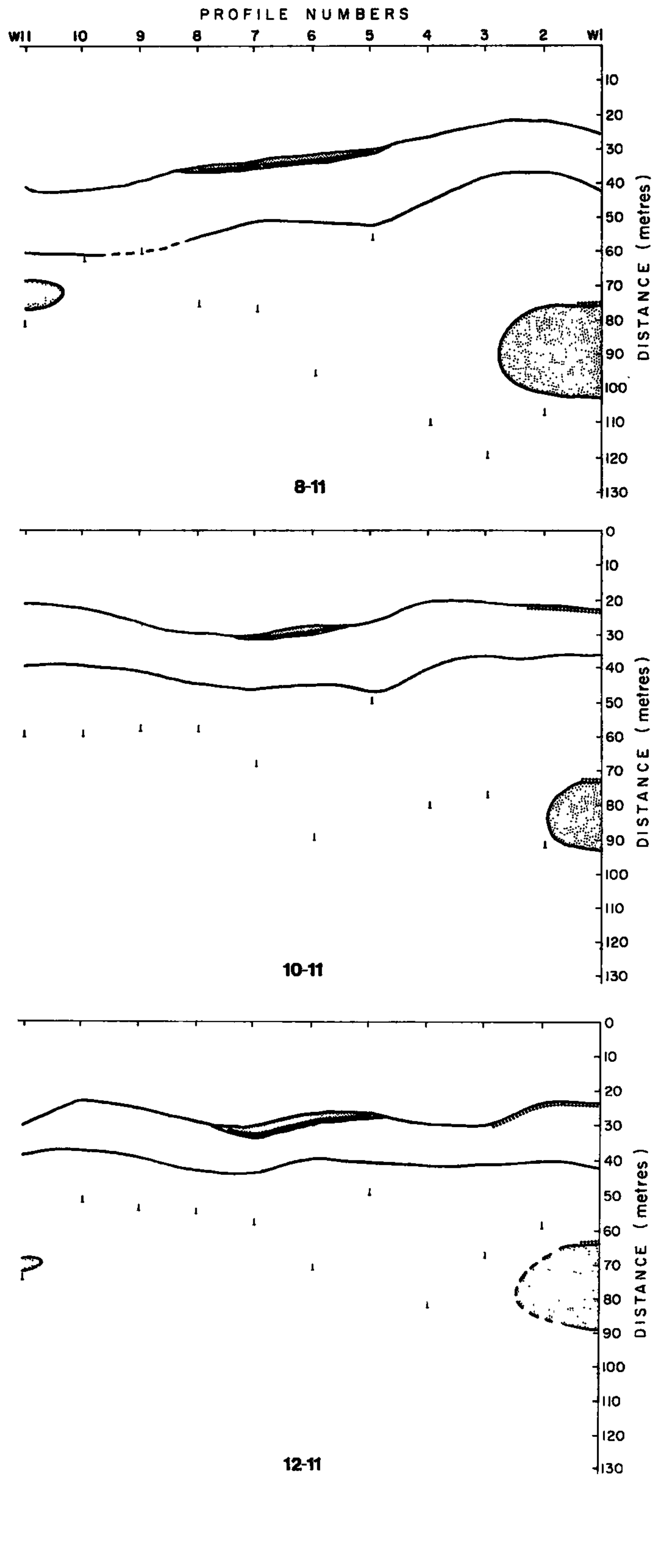

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
DISTANCE (metres)
0
10
20
30
40
50
60
70
80
90
100
110
120
10-8
12-8
14-8

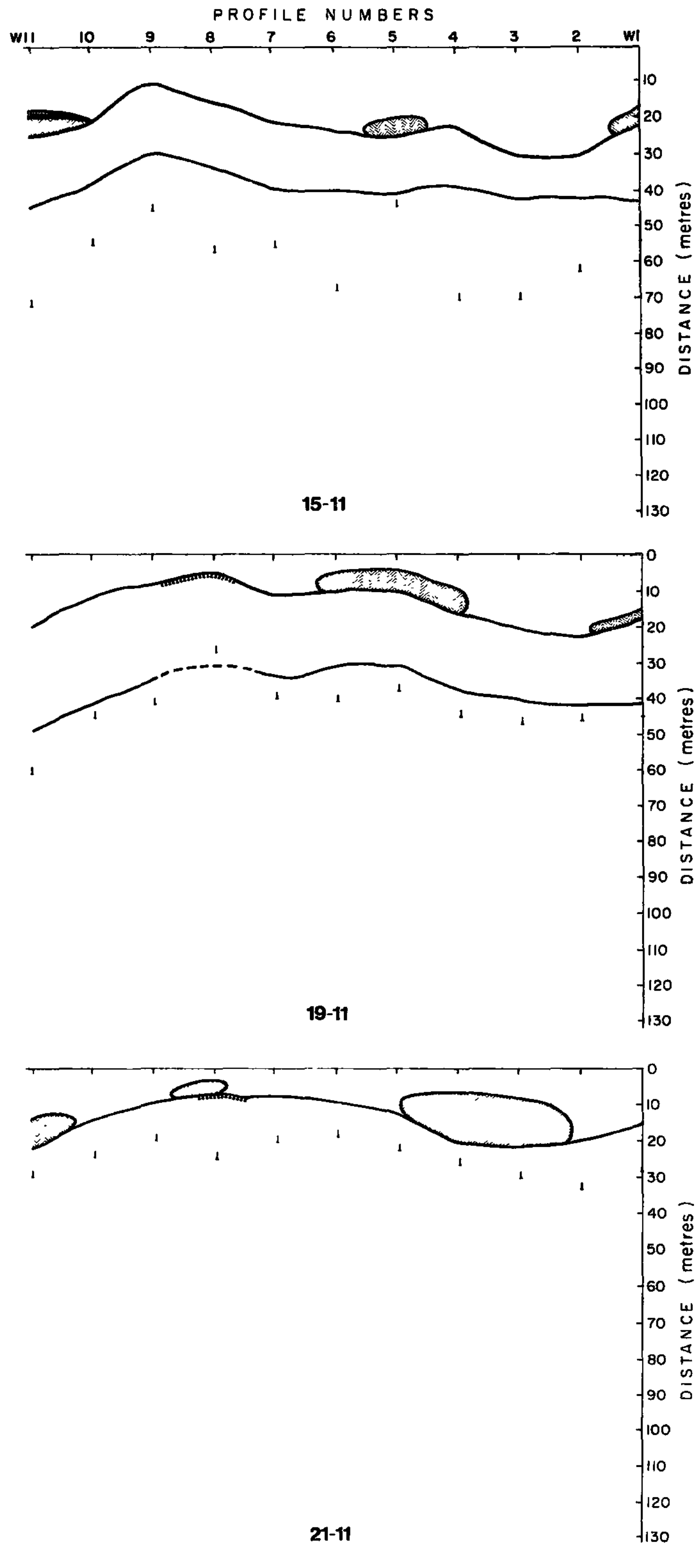

PROFILE NUMBERS
E1
2
3
4
5
6
7
8
9
10
E11
DISTANCE (metres)
18-8
20-8
22-8

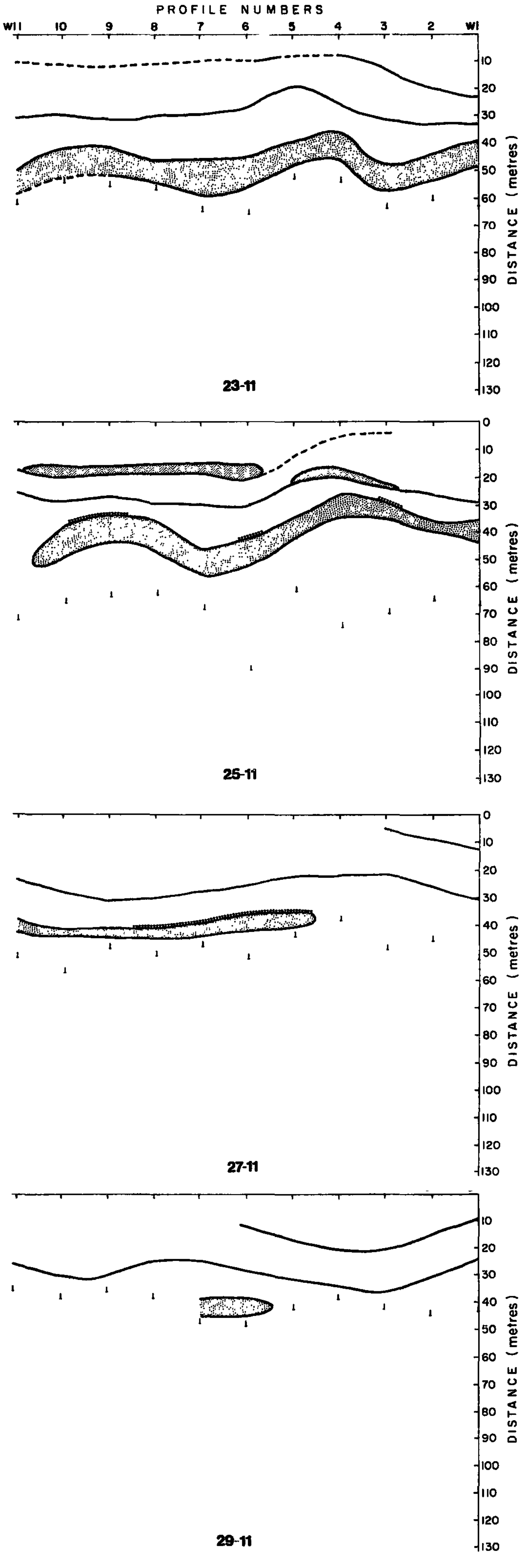

PROFILE NUMBERS
E1 2 3 4 5 6 7 8 9 10 E11
DISTANCE (metres)
0 10 20 30 40 50 60 70 80 90 100 110 120
25-8
DISTANCE (metres)
0 10 20 30 40 50 60 70 80 90 100 110 120
27-8

MORPHOLOGIC MAPS

Winter west


PROFILE NUMBERS
W11 10 9 8 7 6 5 4 3 2 W1
DISTANCE (metres)
8-11
10-11
12-11

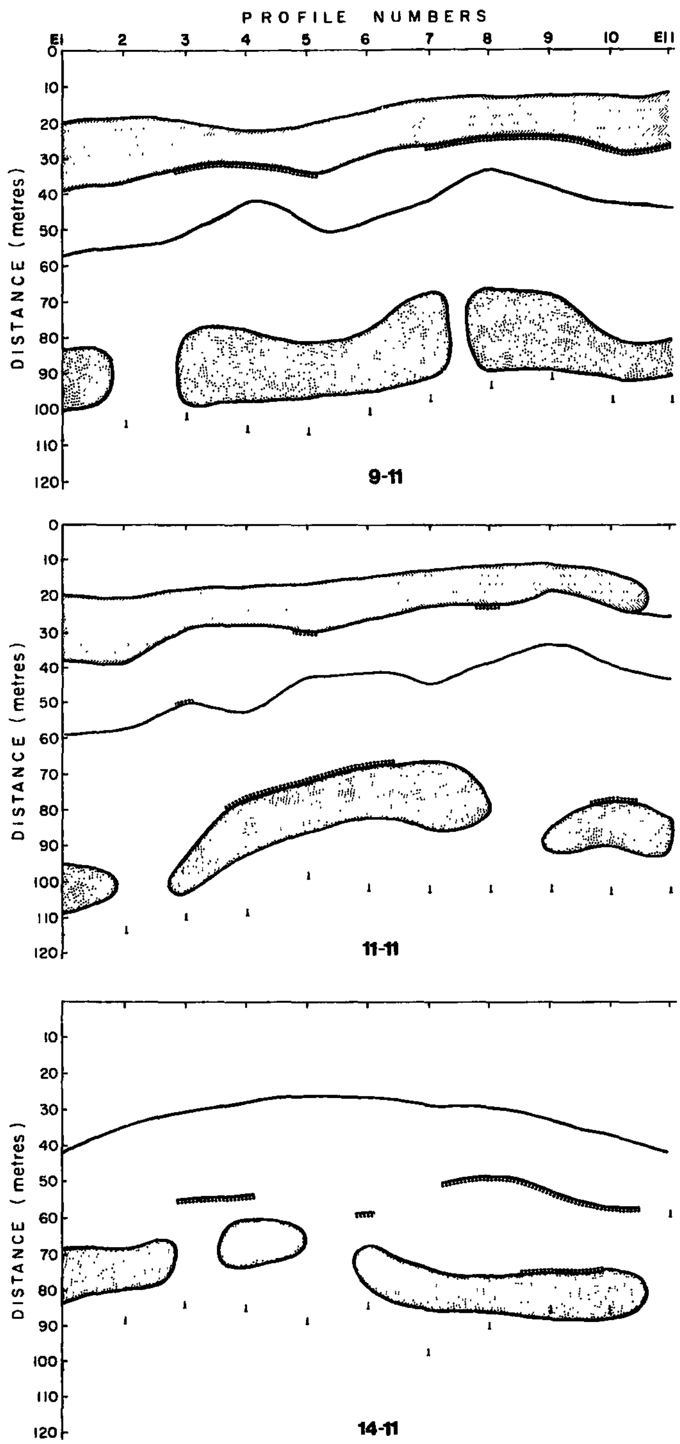

PROFILE NUMBERS
W11 10 9 8 7 6 5 4 3 2 W1
DISTANCE (metres)
10 20 30 40 50 60 70 80 90 100 110 120 130
15-11
0 10 20 30 40 50 60 70 80 90 100 110 120 130
19-11
0 10 20 30 40 50 60 70 80 90 100 110 120 130
21-11

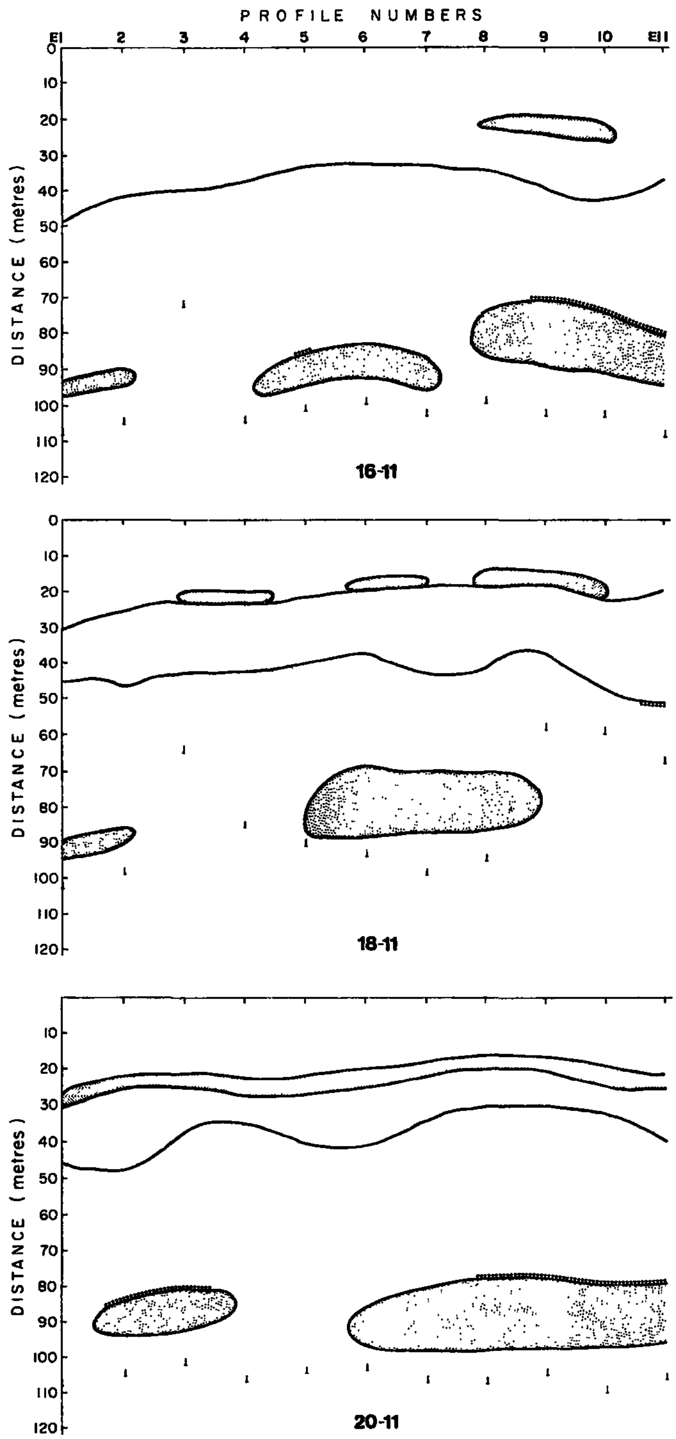


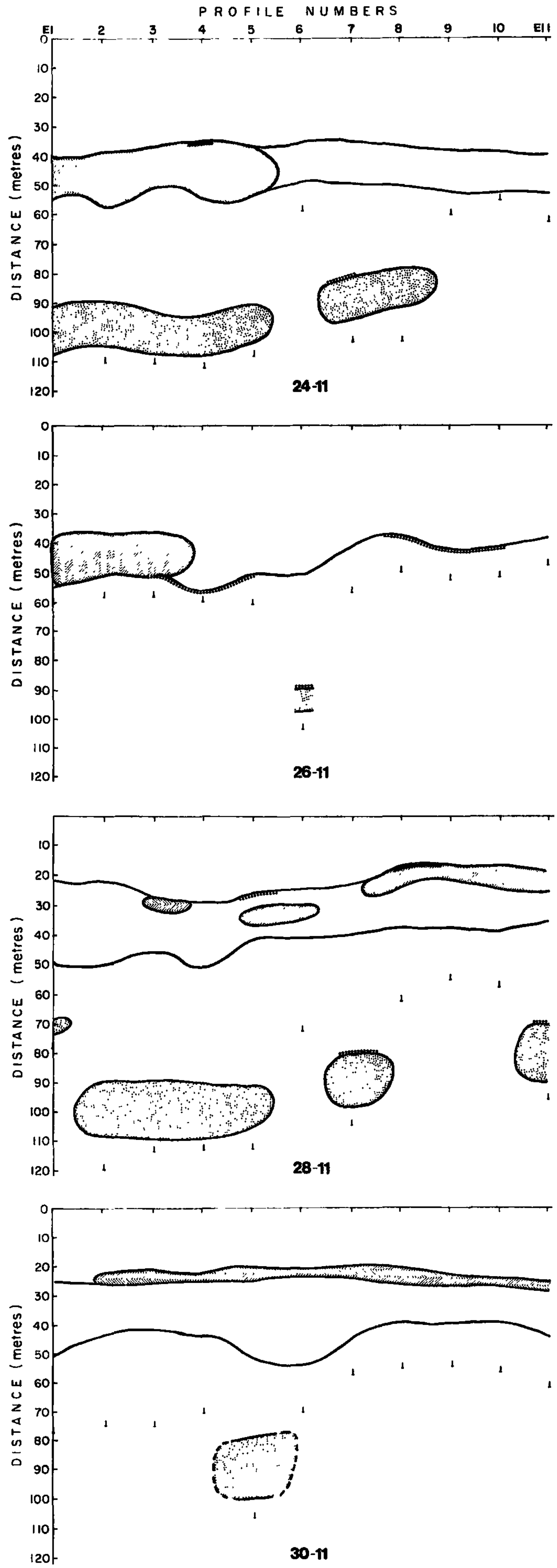
PROFILE NUMBERS
WII
10
9
8
7
6
5
4
3
2
WI
DISTANCE (metres)
23-11
25-11
27-11
29-11

MORPHOLOGIC MAPS

Winter east

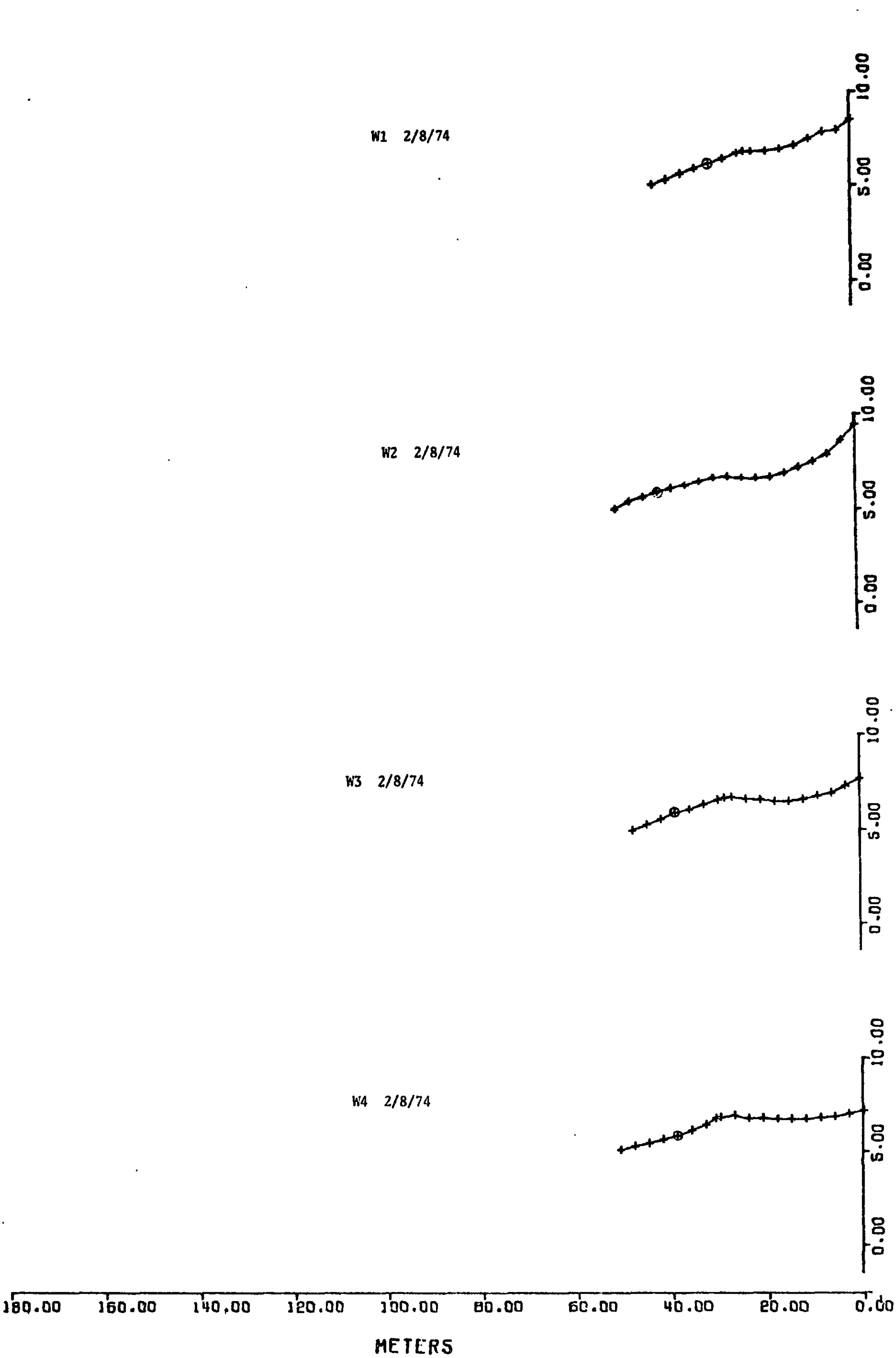

PROFILE NUMBERS
E1 2 3 4 5 6 7 8 9 10 E11
DISTANCE (metres)
0 10 20 30 40 50 60 70 80 90 100 110 120
9-11
11-11
14-11


PROFILE NUMBERS
E1 2 3 4 5 6 7 8 9 10 E11
DISTANCE (metres)
0 10 20 30 40 50 60 70 80 90 100 110 120
16-11
18-11
20-11


PROFILE NUMBERS
EI
2
3
4
5
6
7
8
9
10
EII
DISTANCE (metres)
24-11
26-11
28-11
30-11

PROFILE PLOTS

Summer west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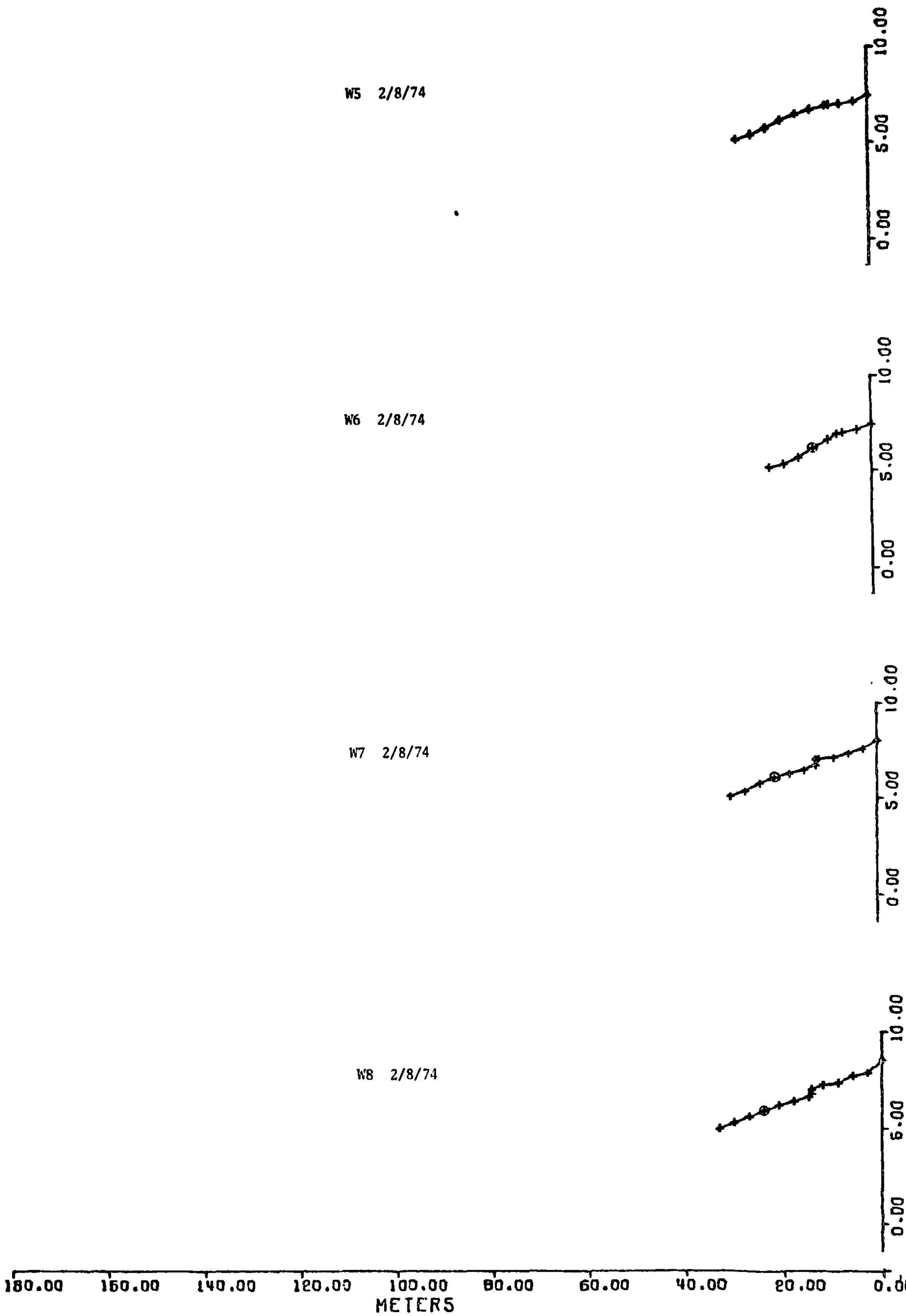
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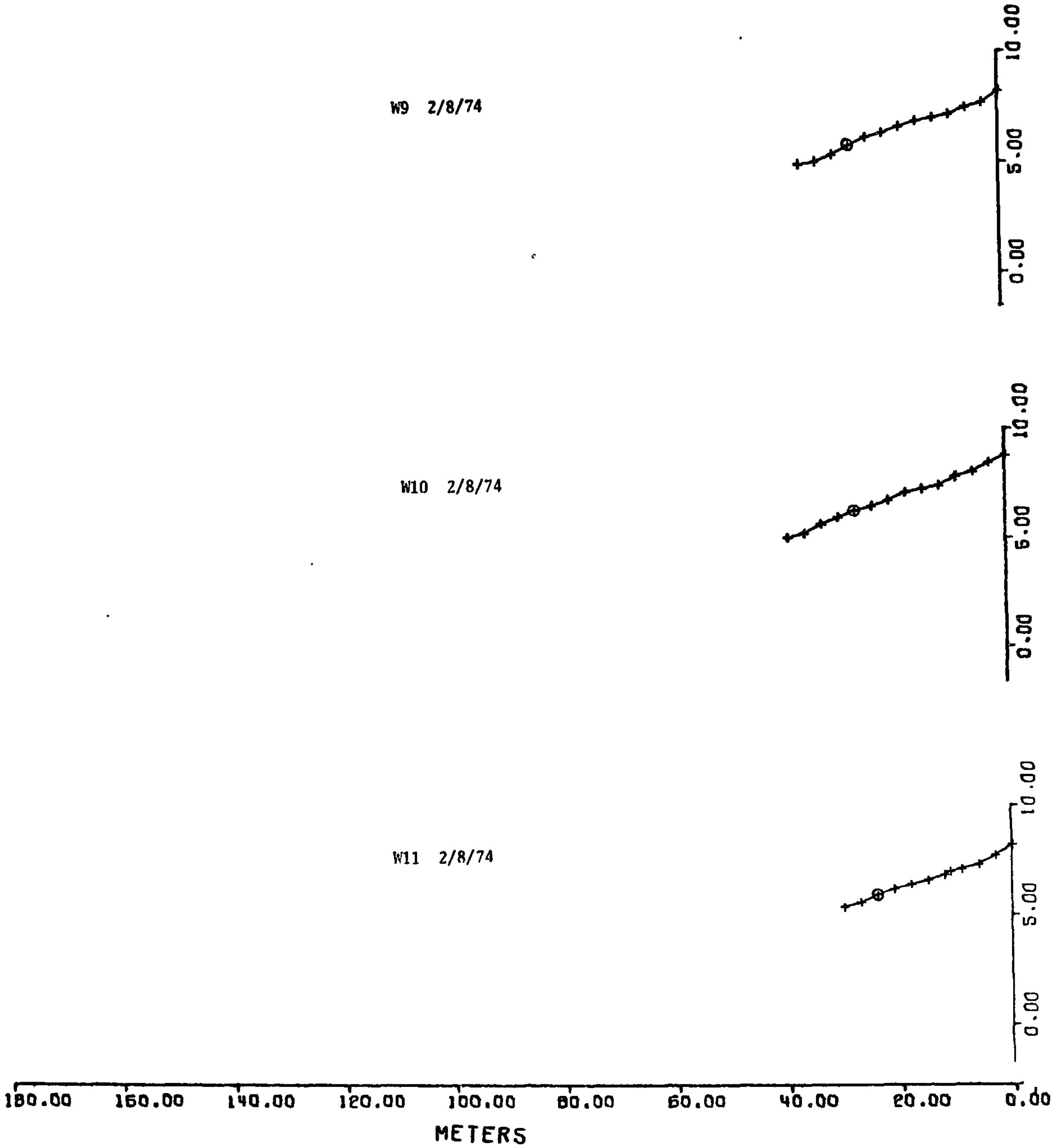

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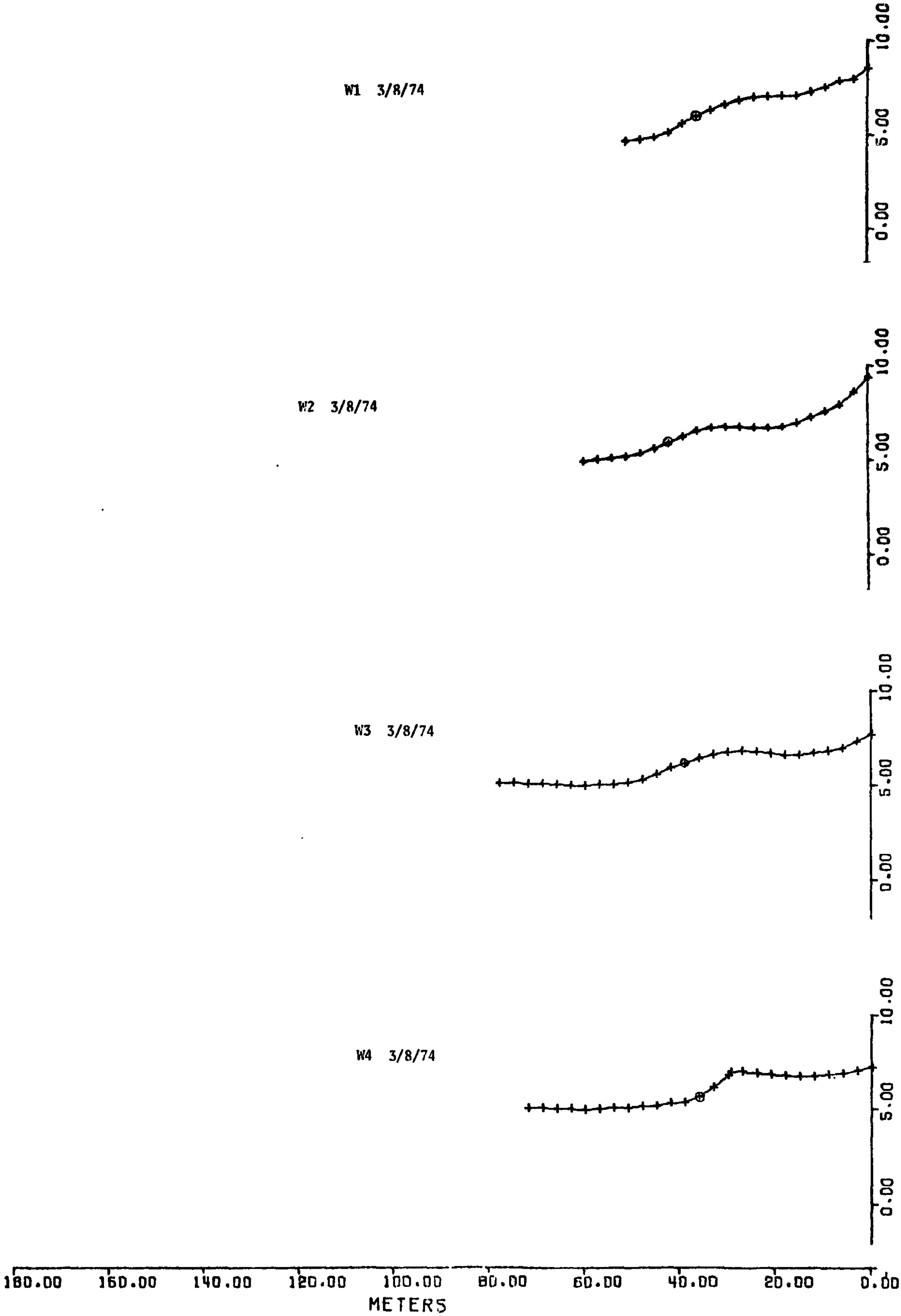
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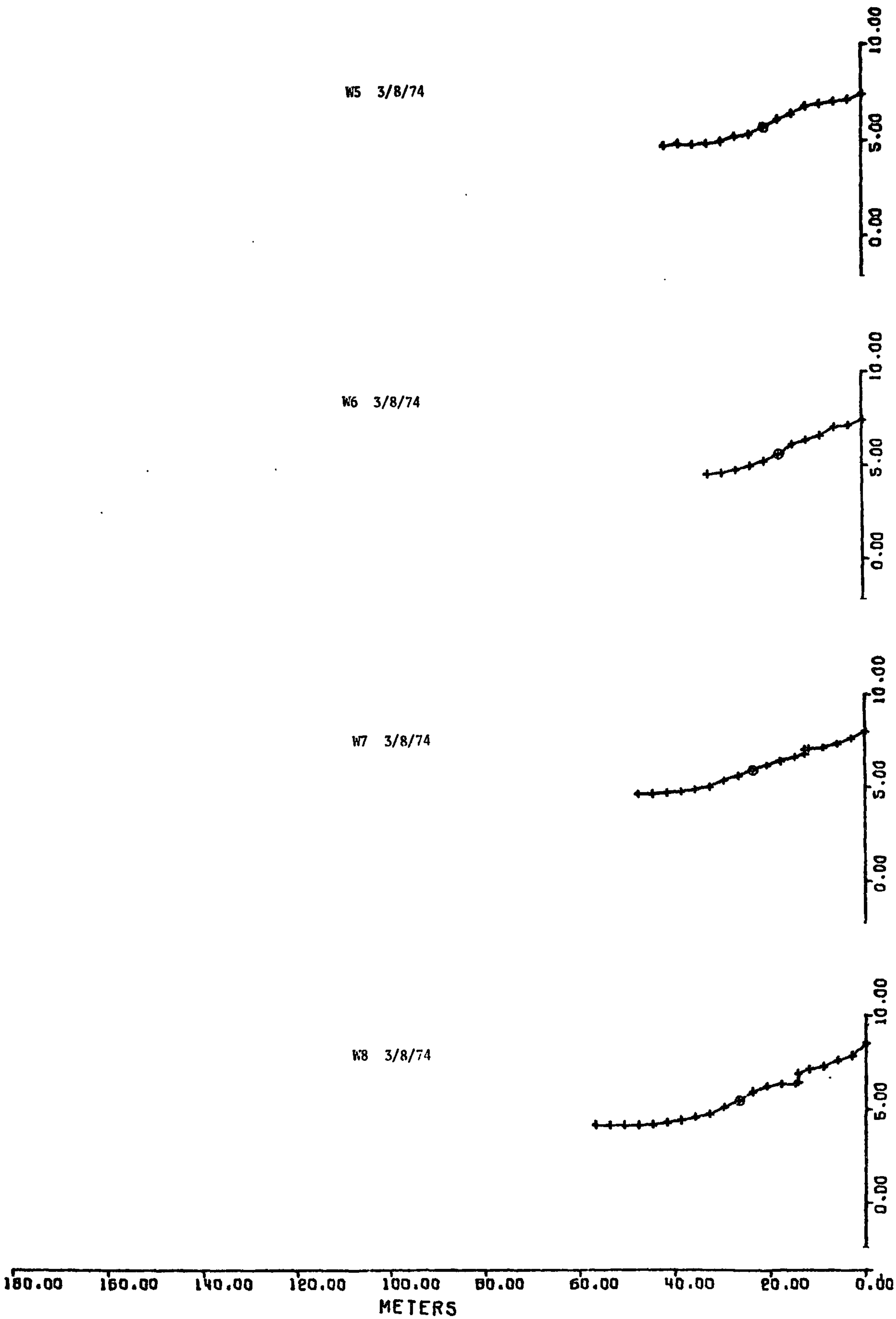
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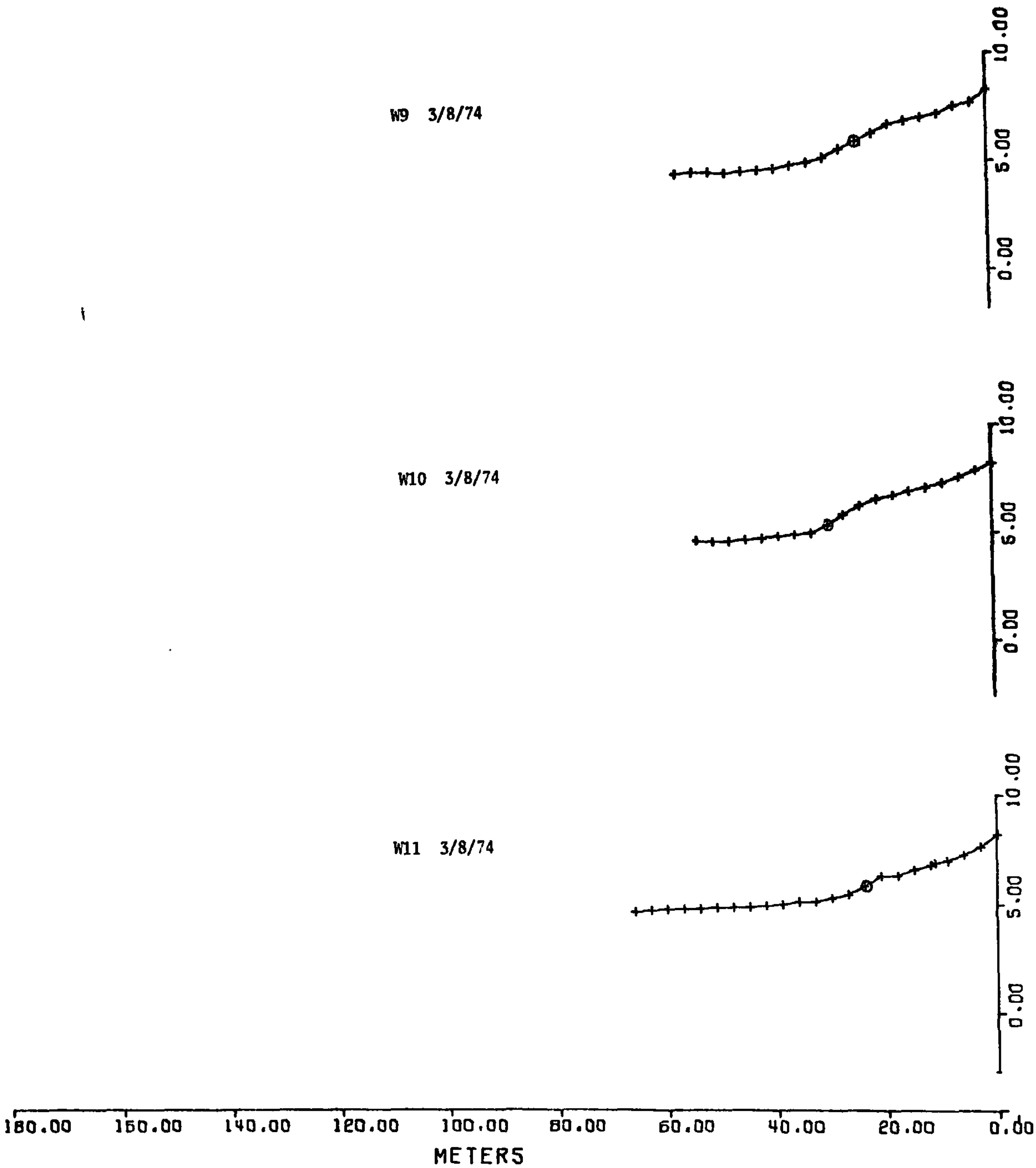

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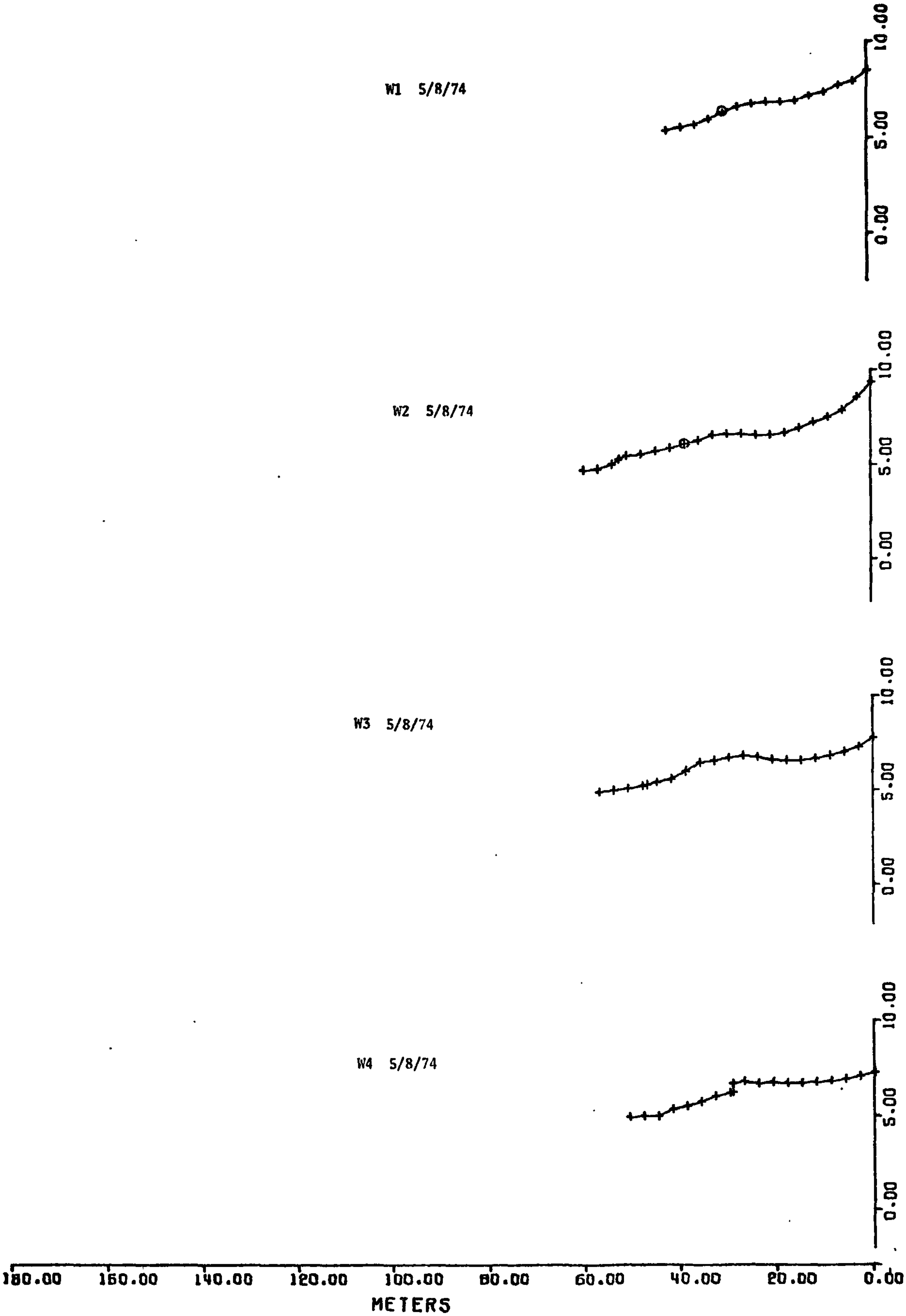
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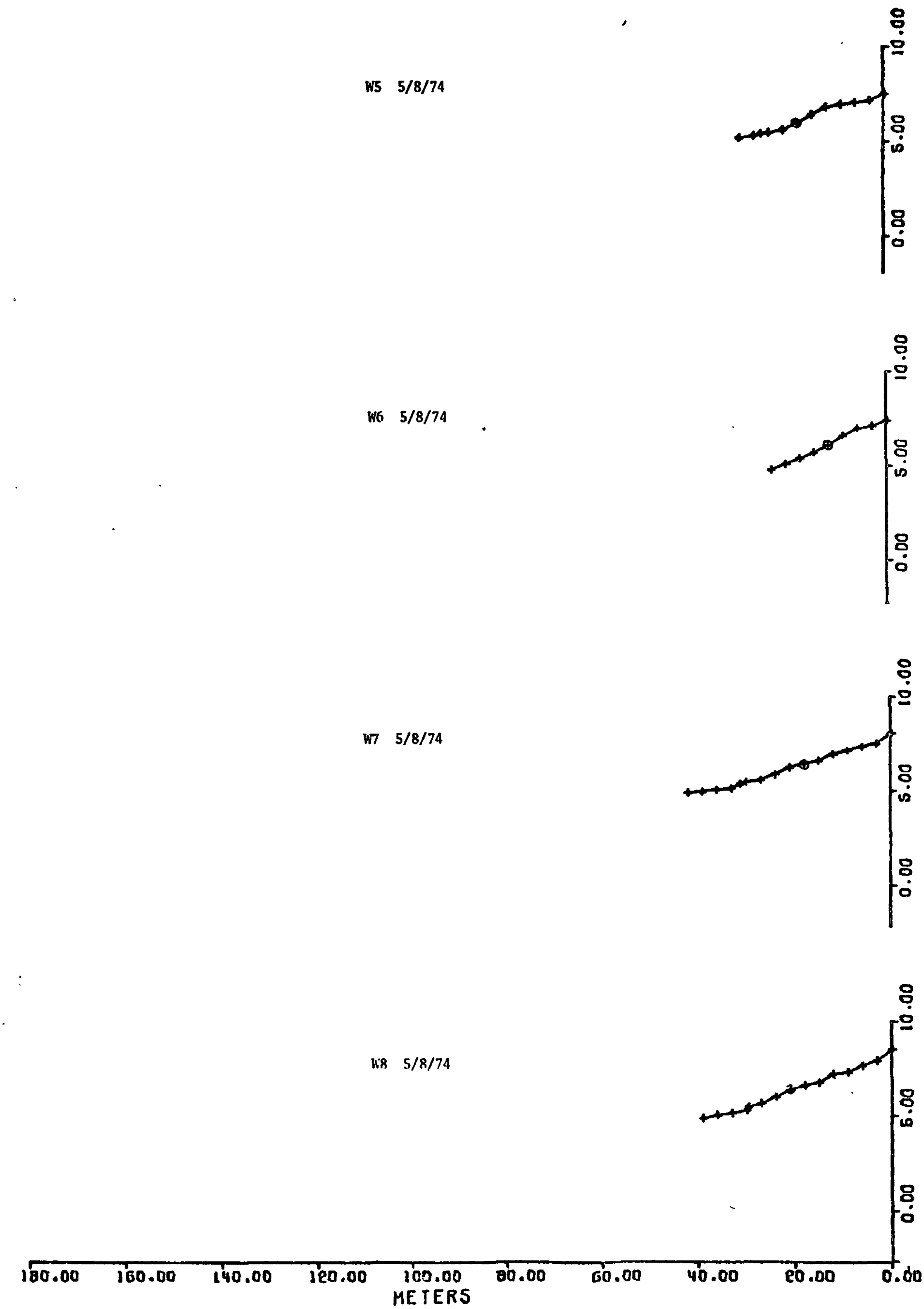
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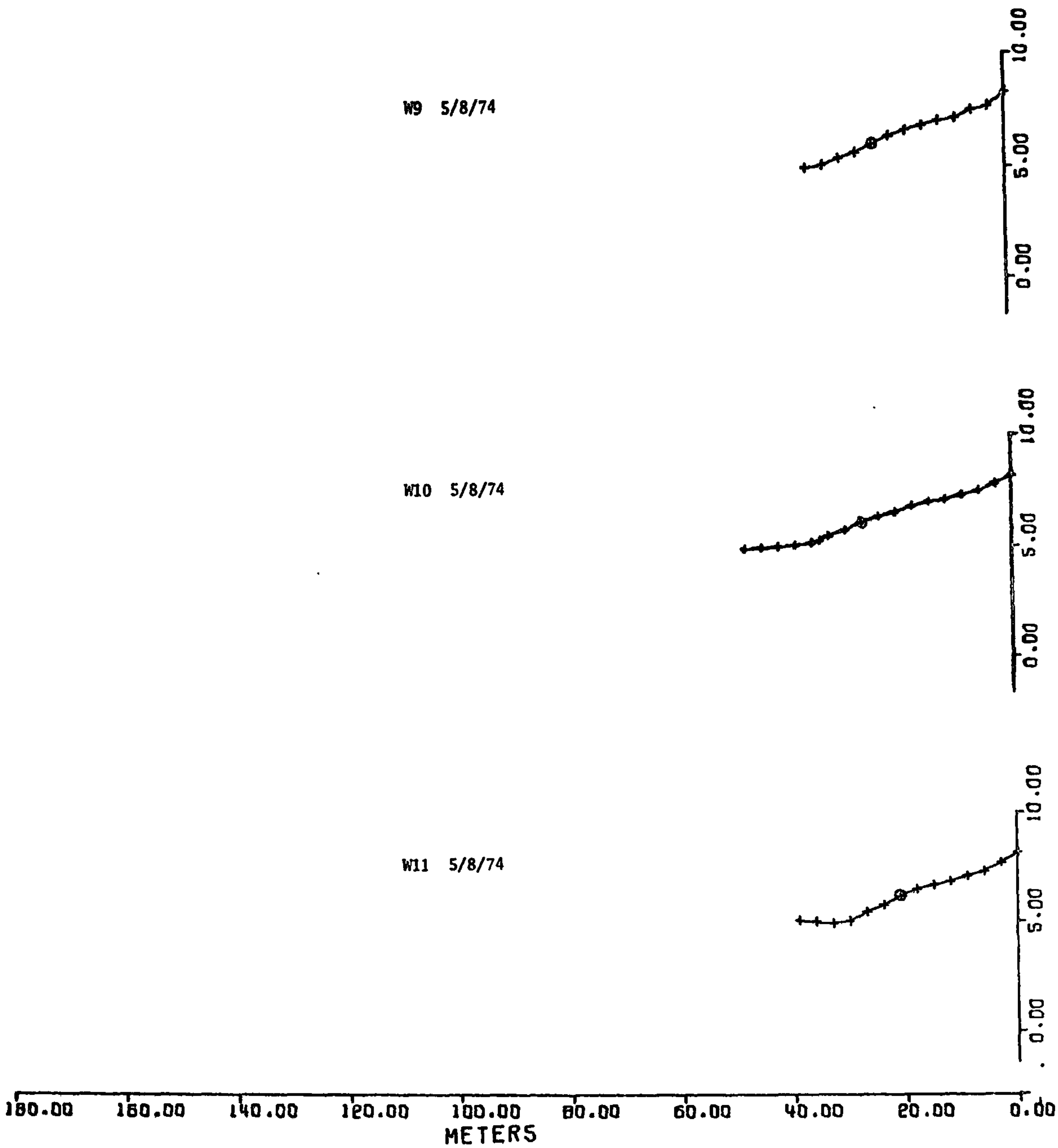
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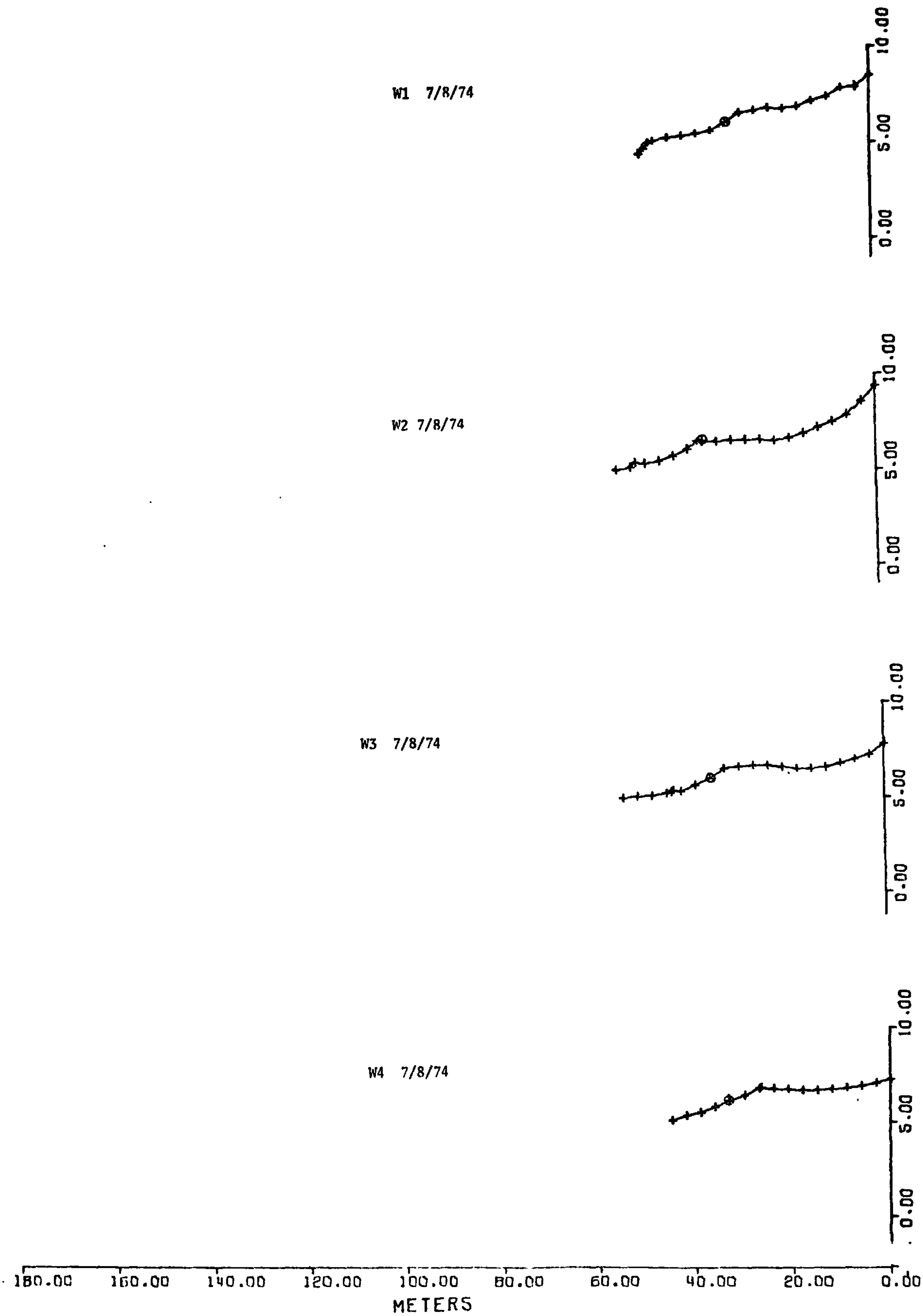
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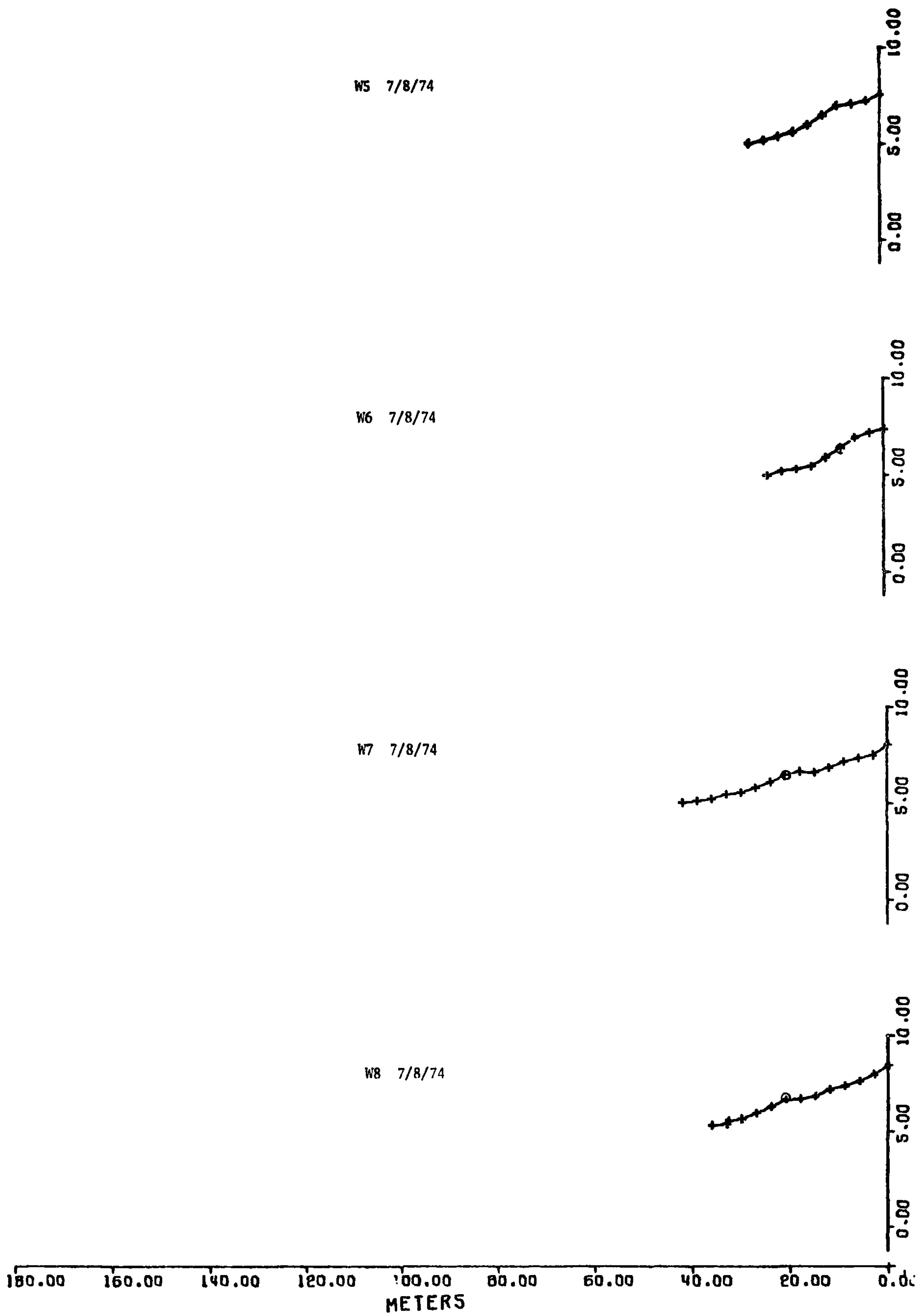
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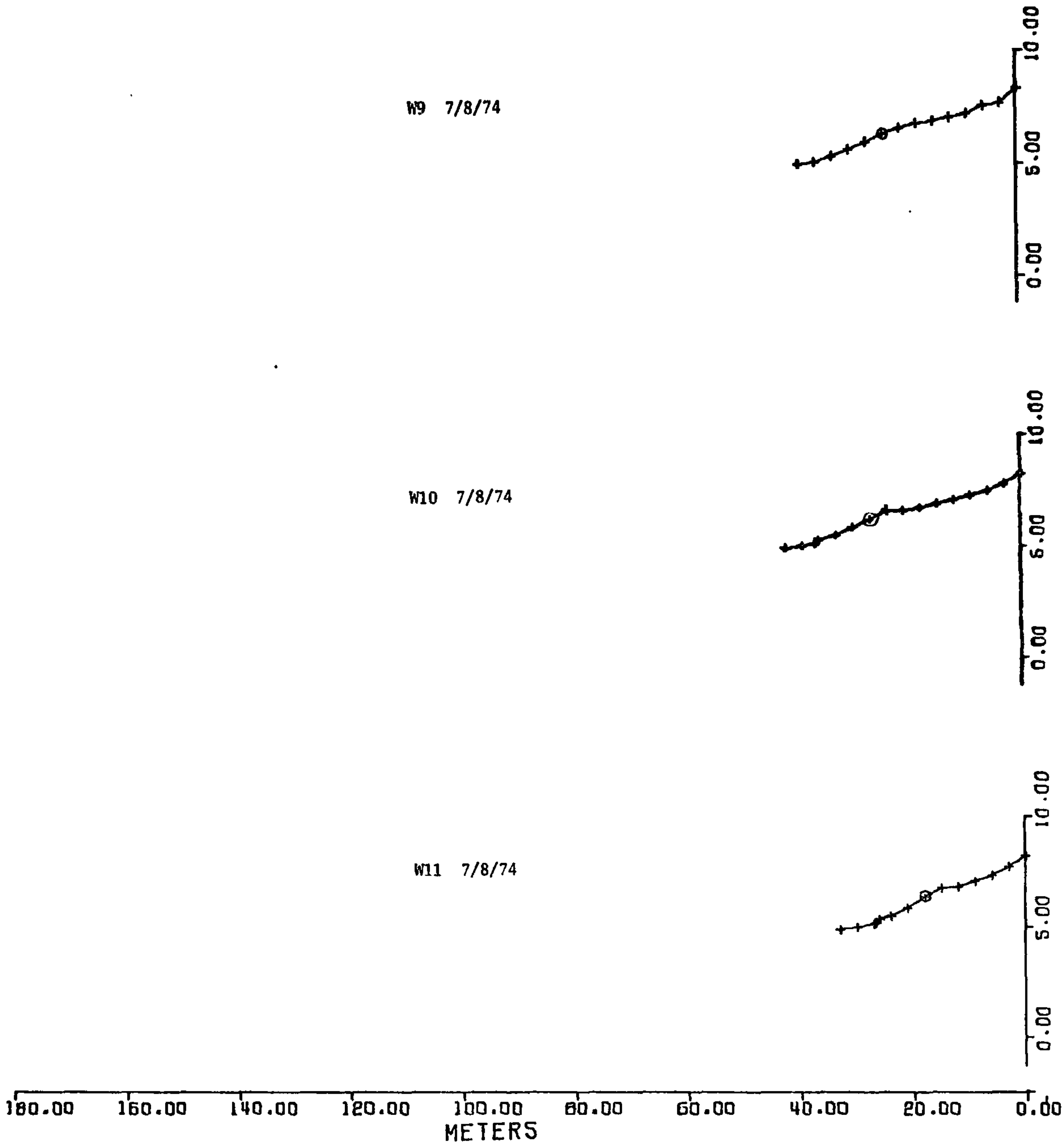
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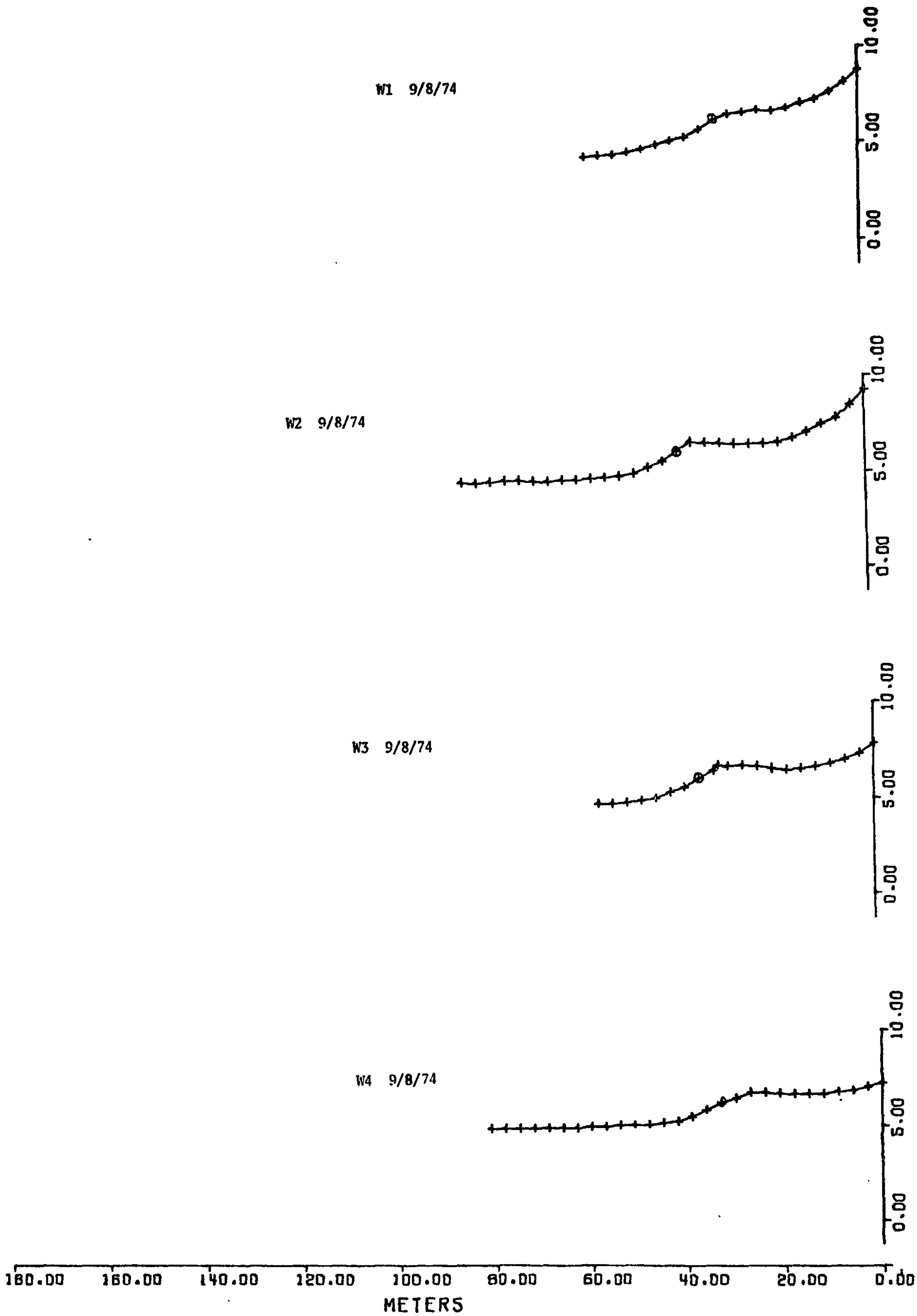
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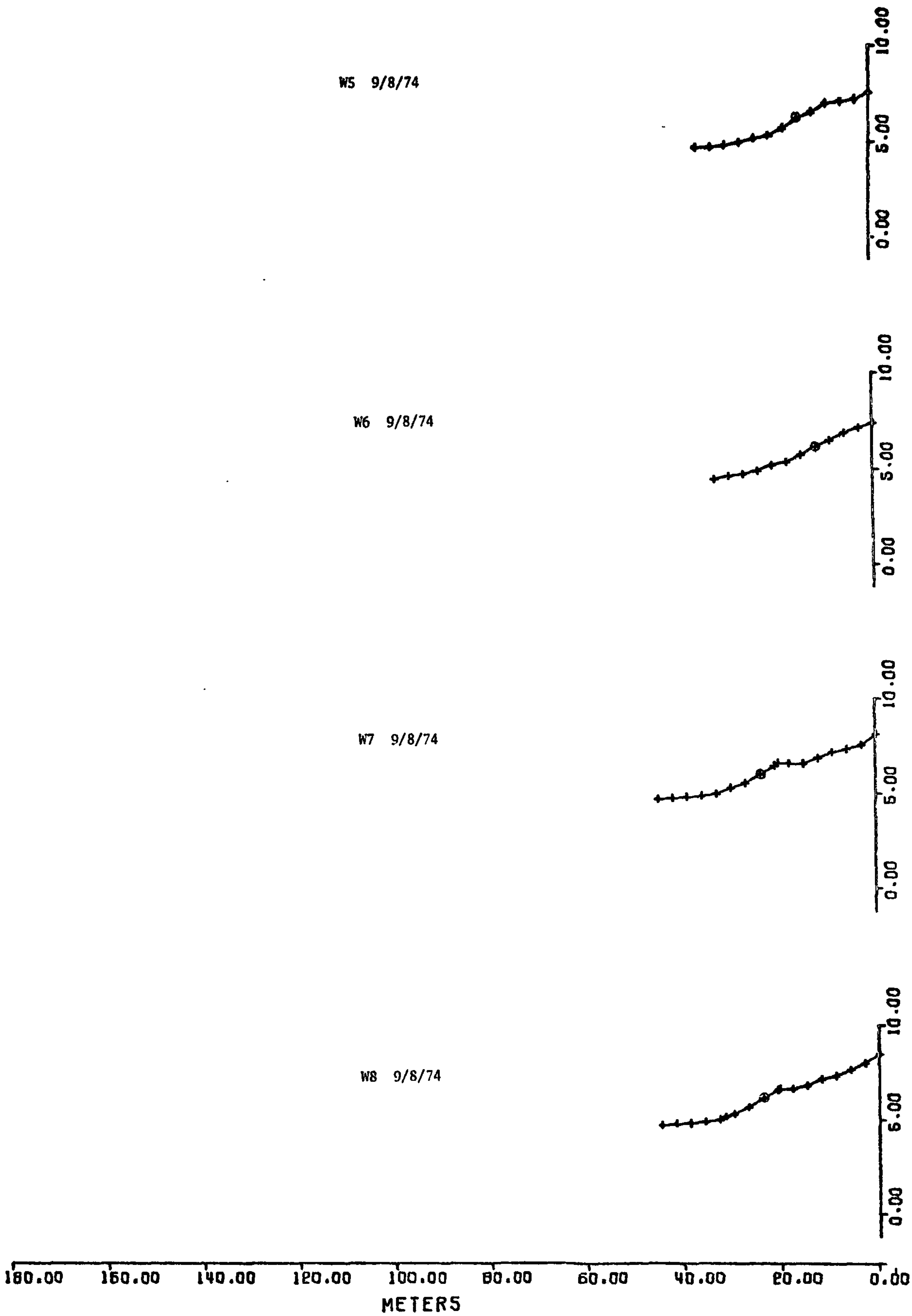

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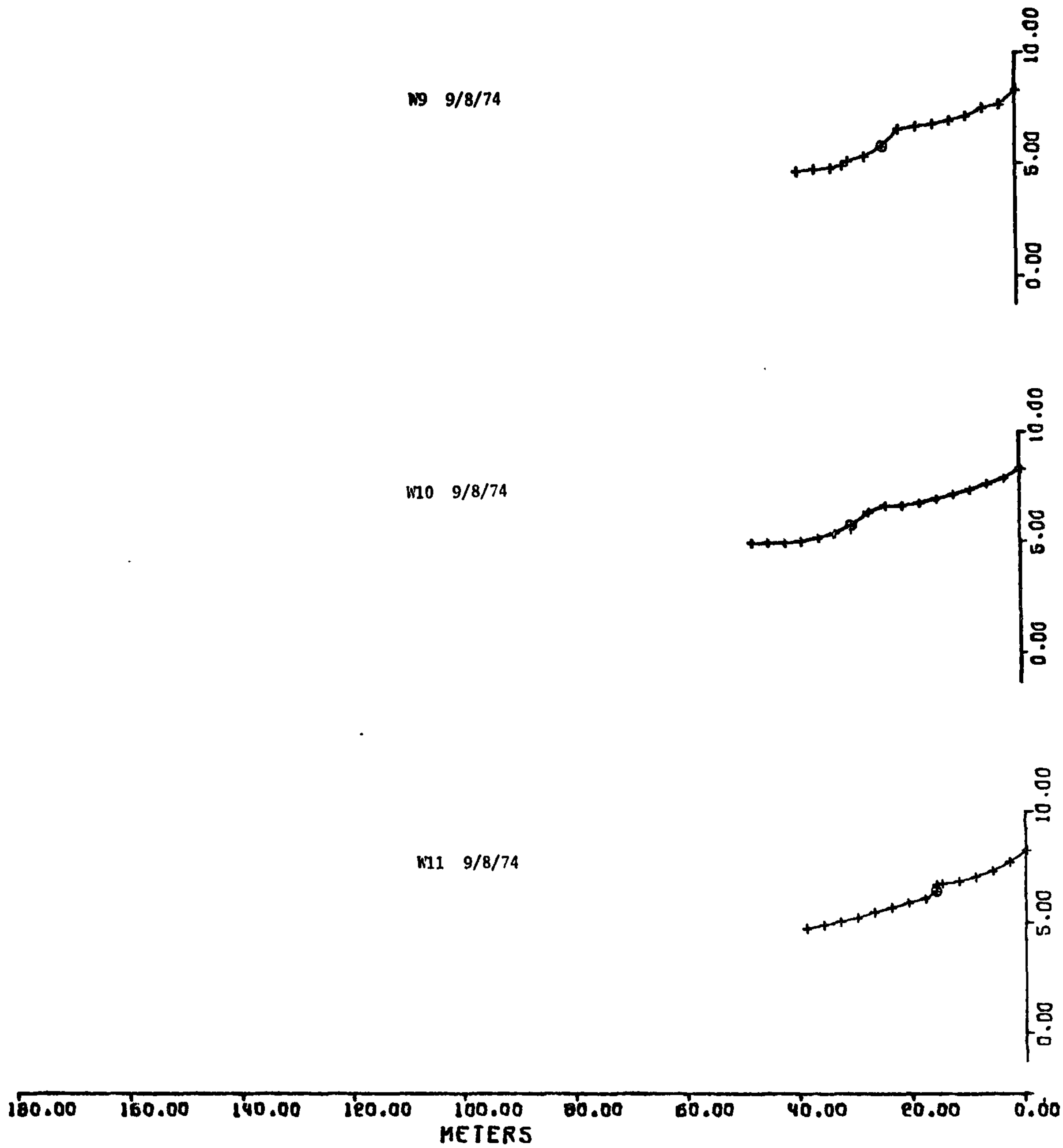
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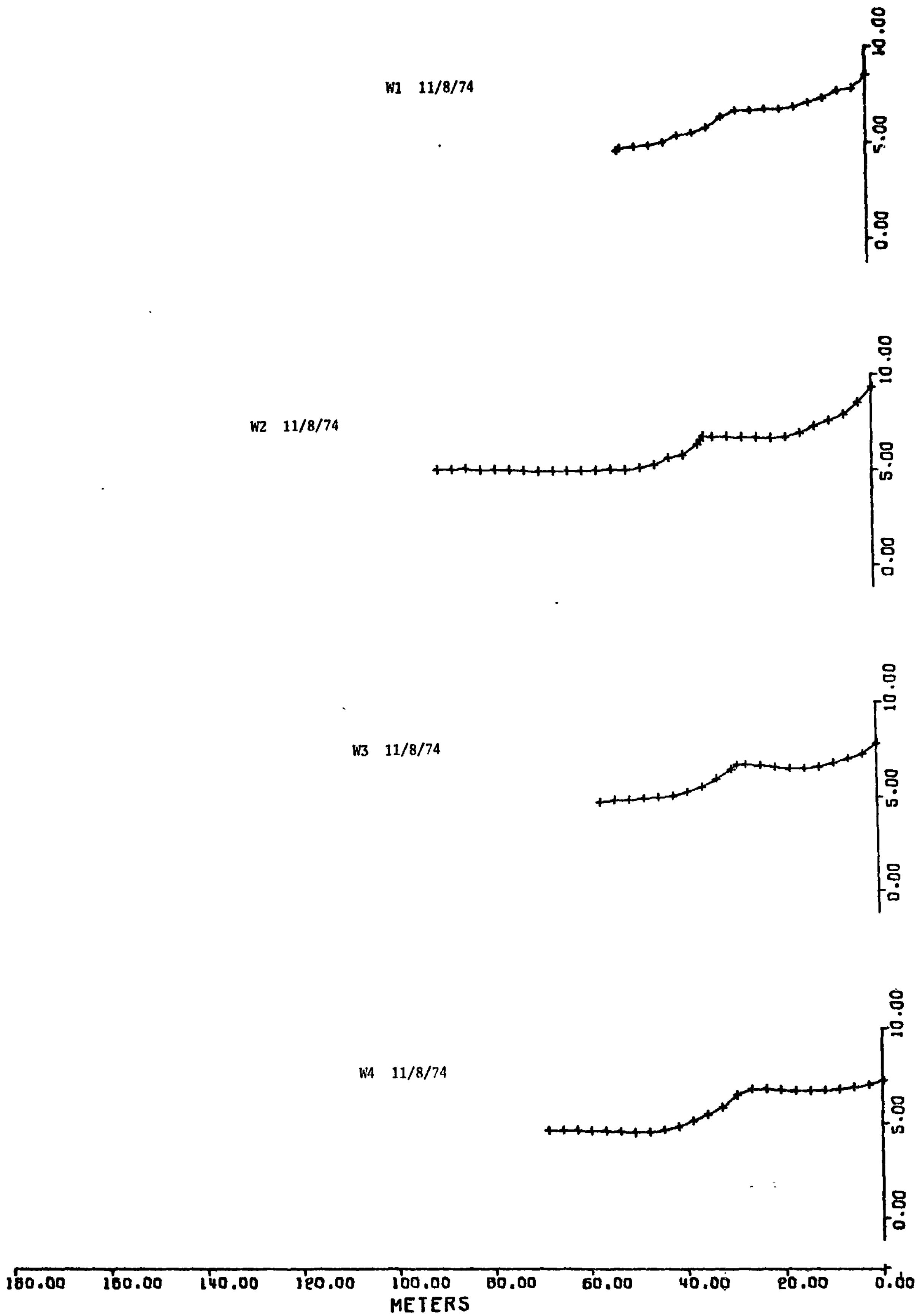
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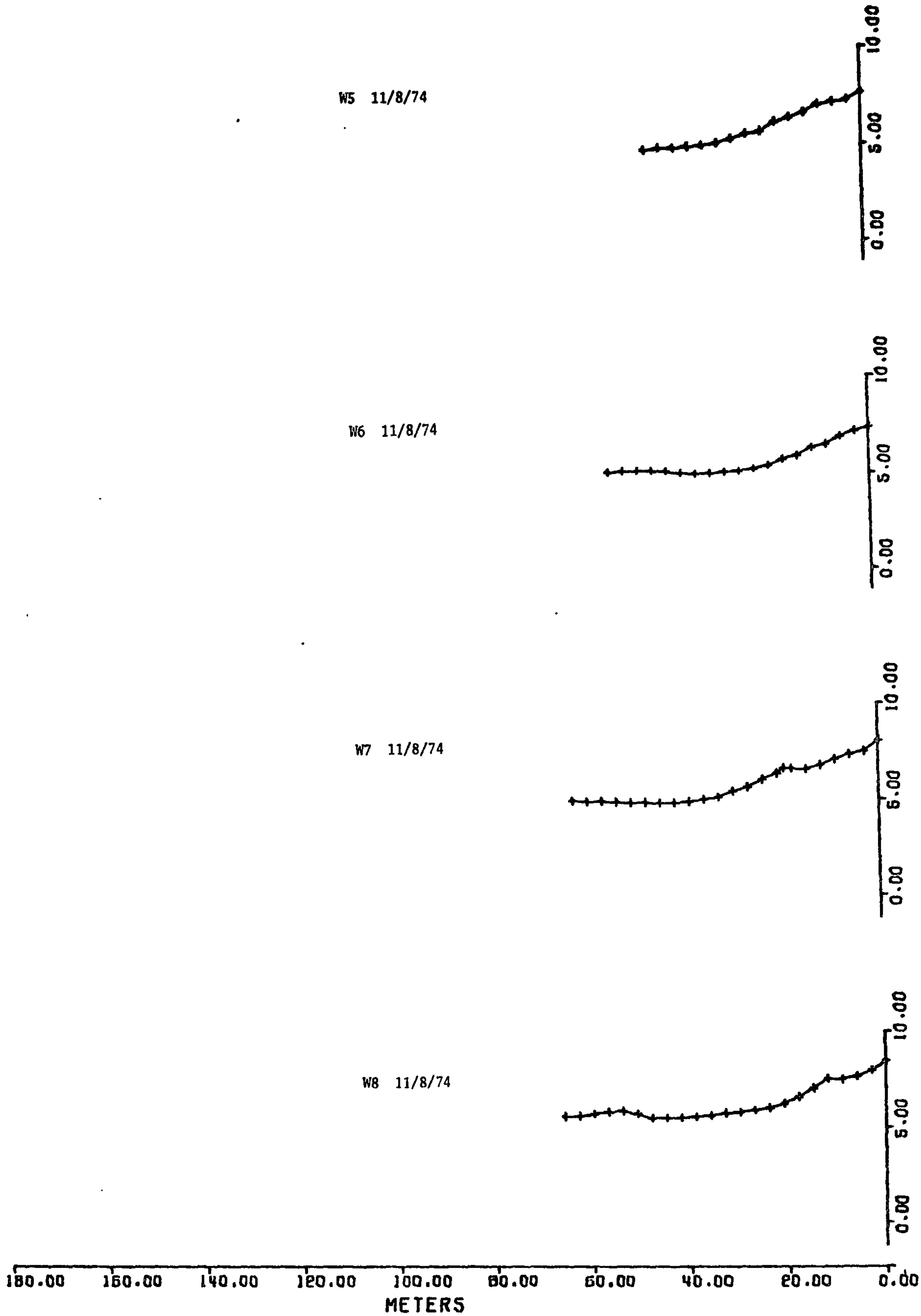
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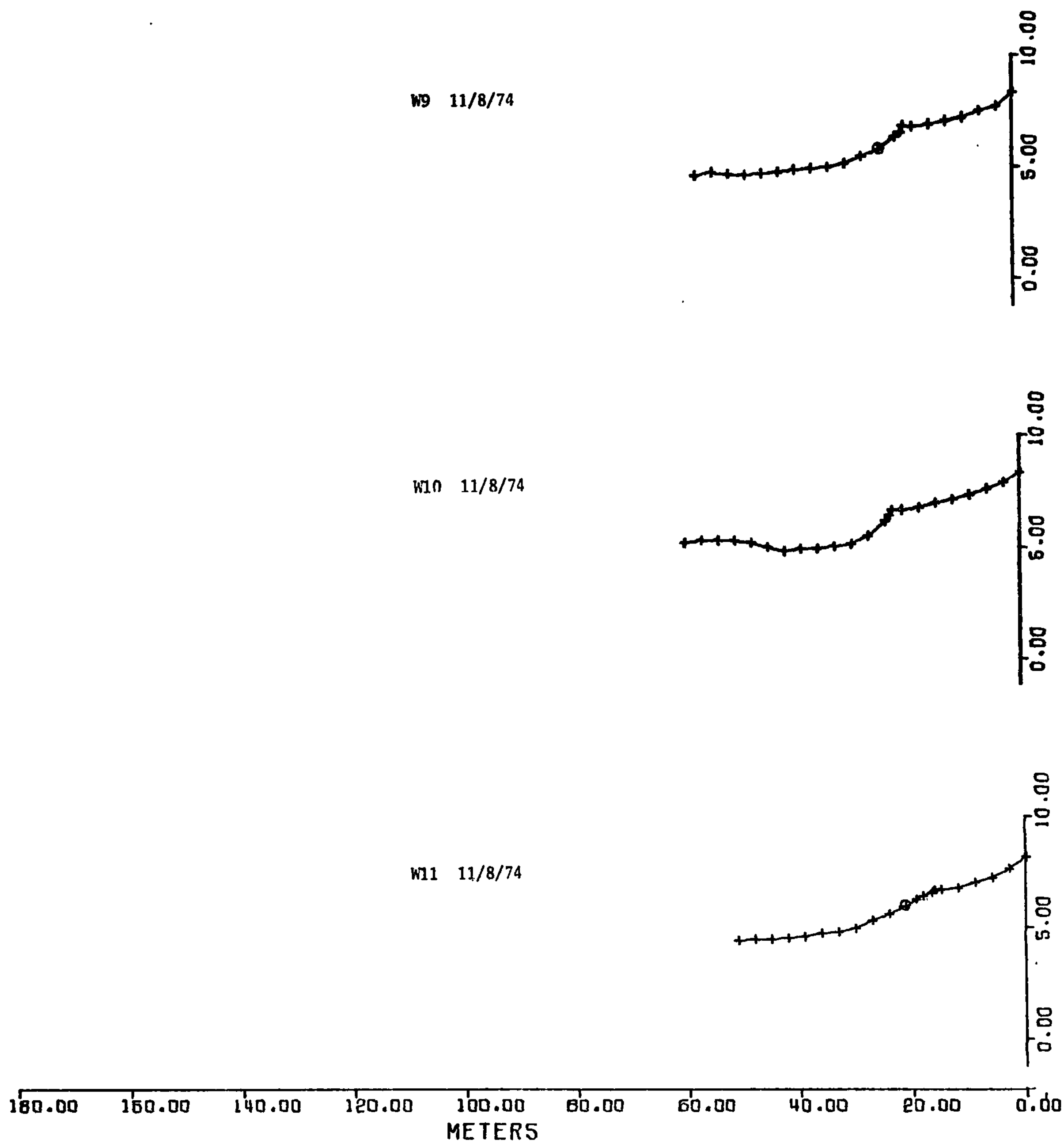
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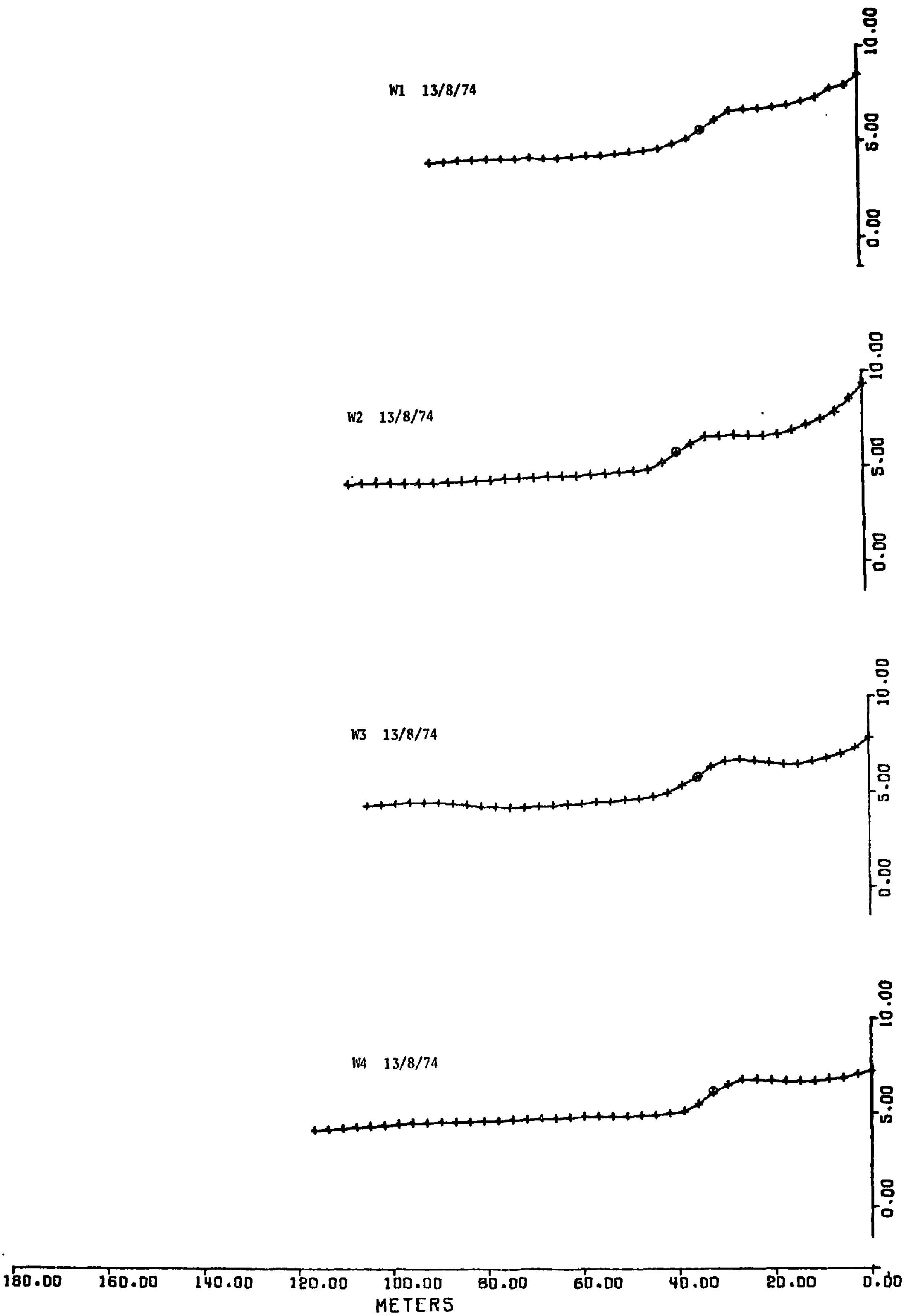
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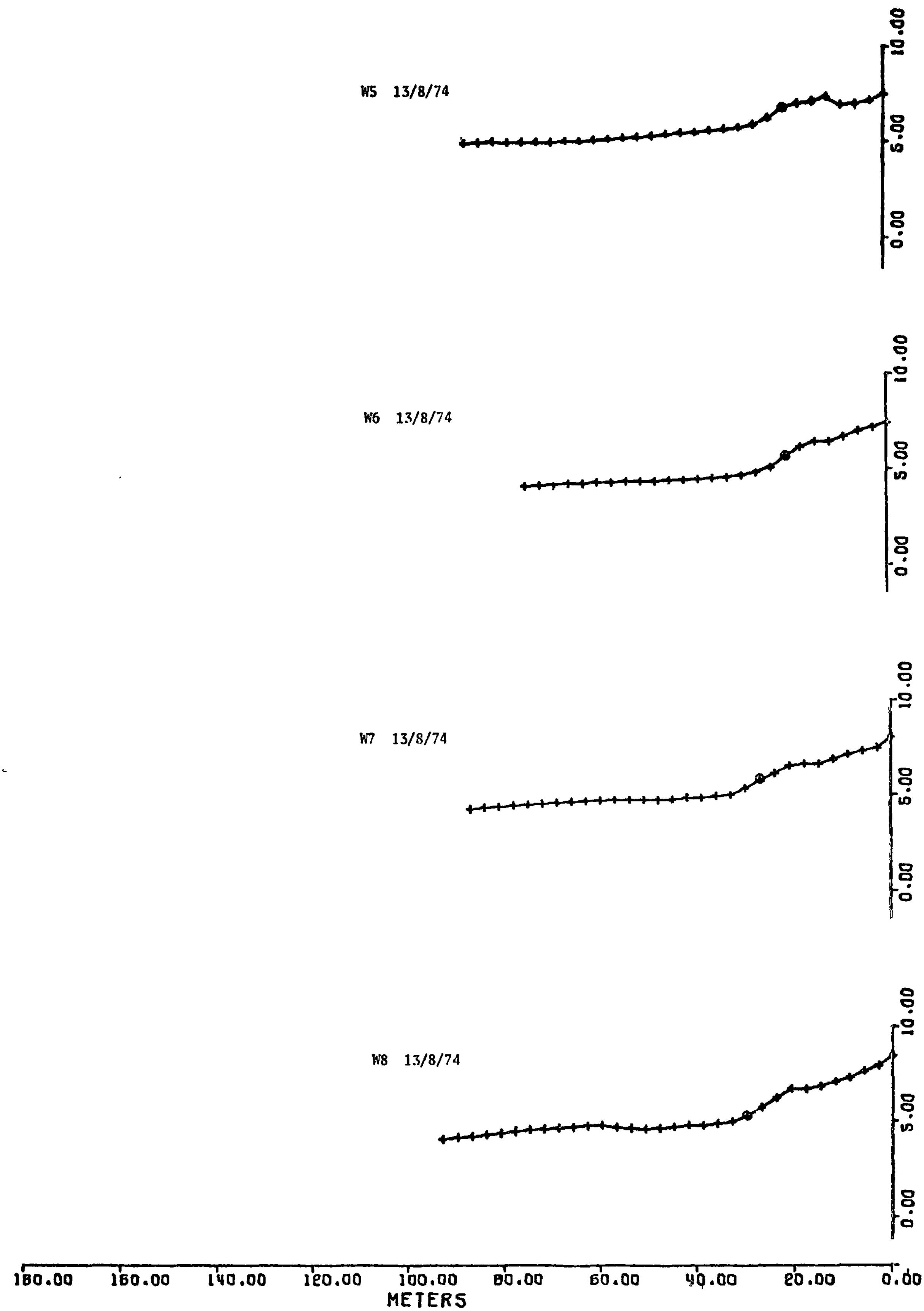
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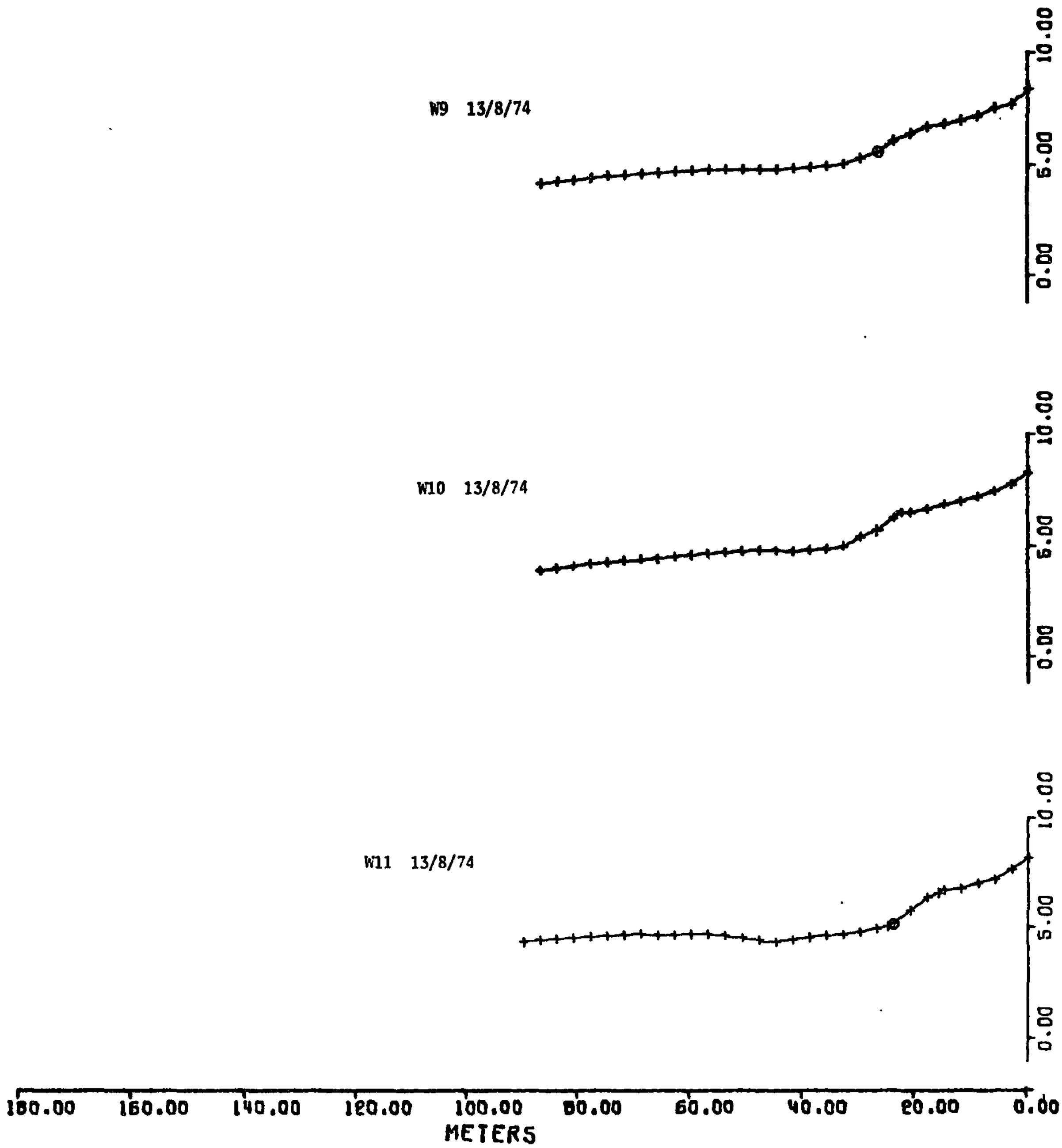
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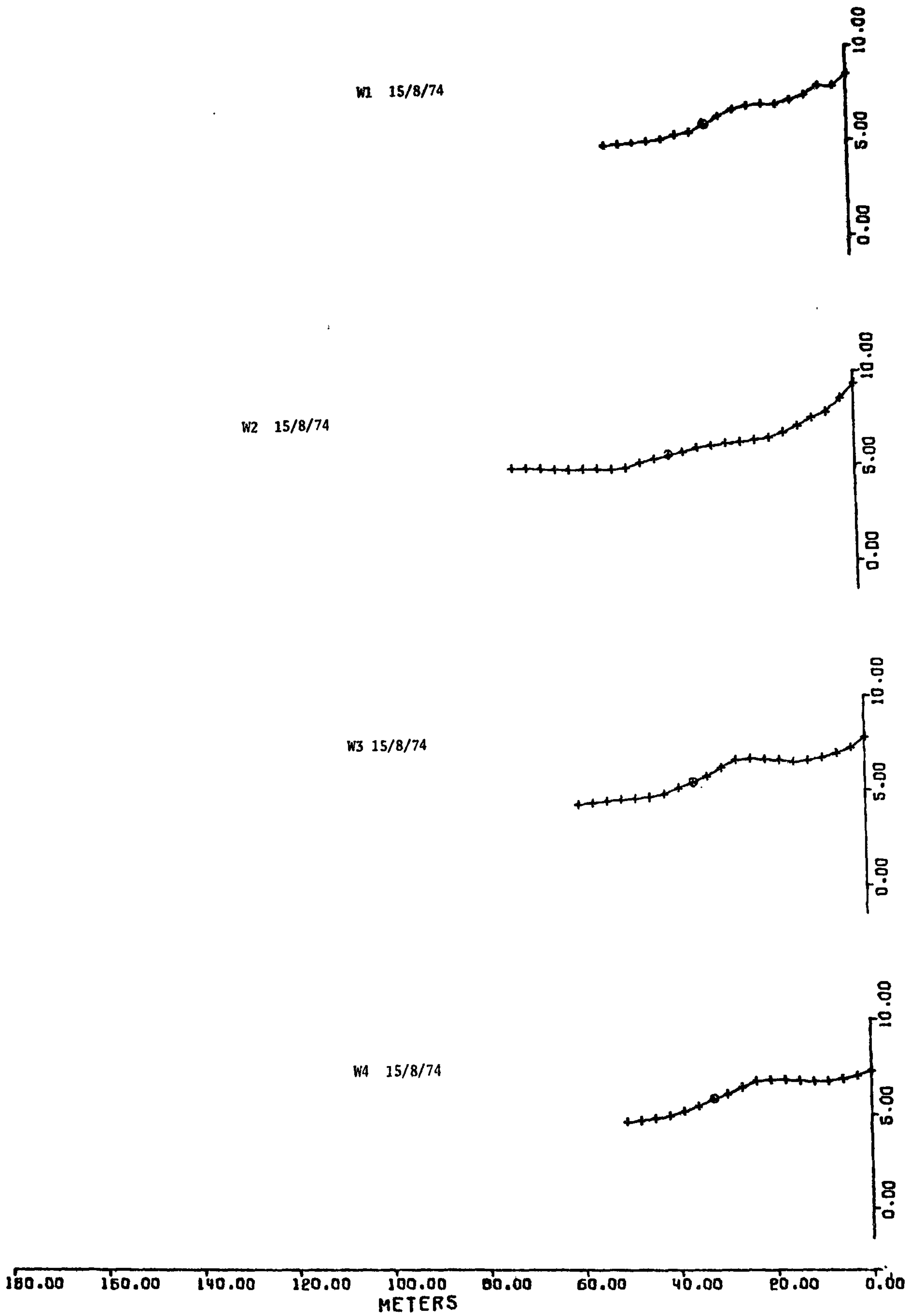
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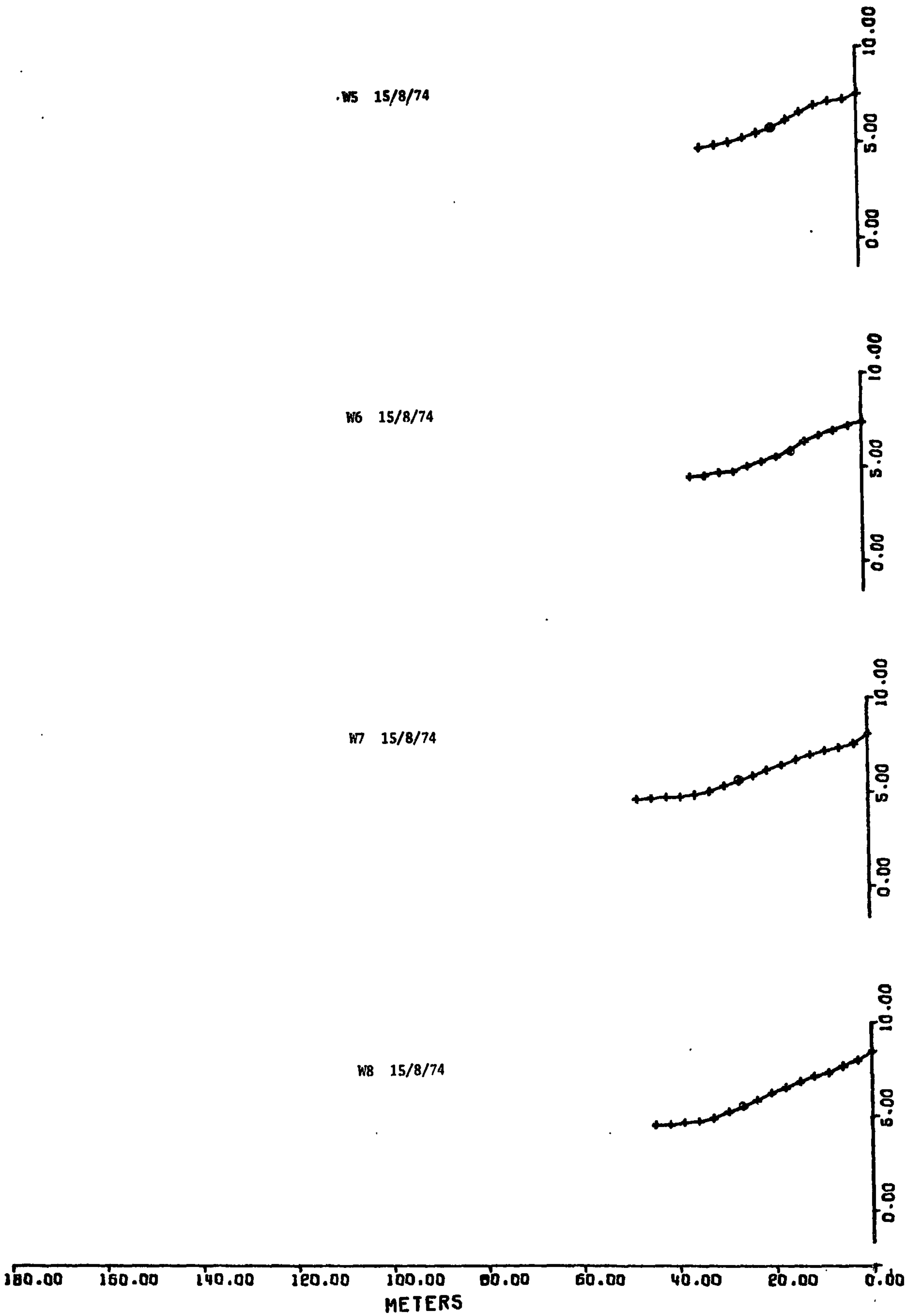
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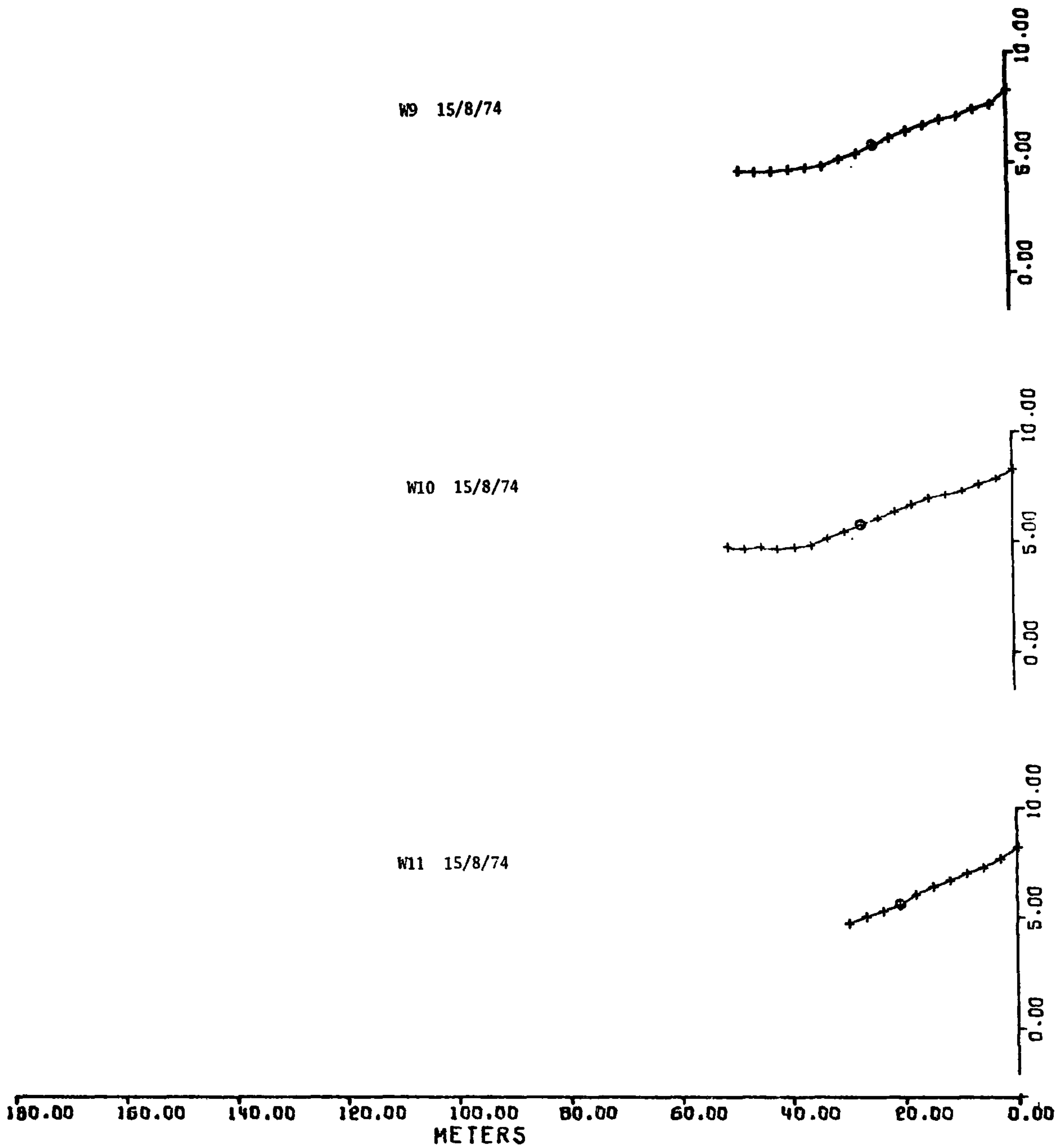
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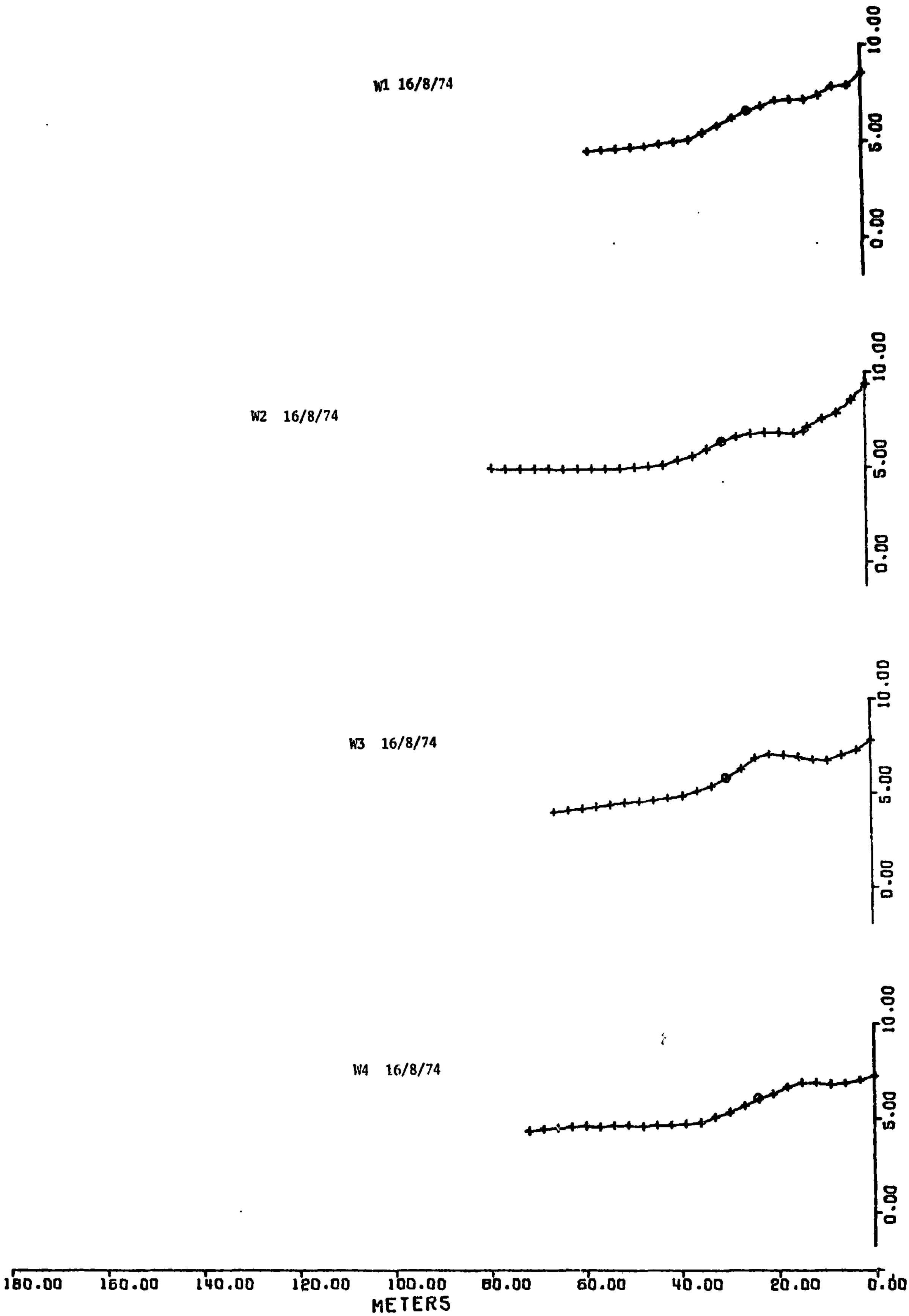
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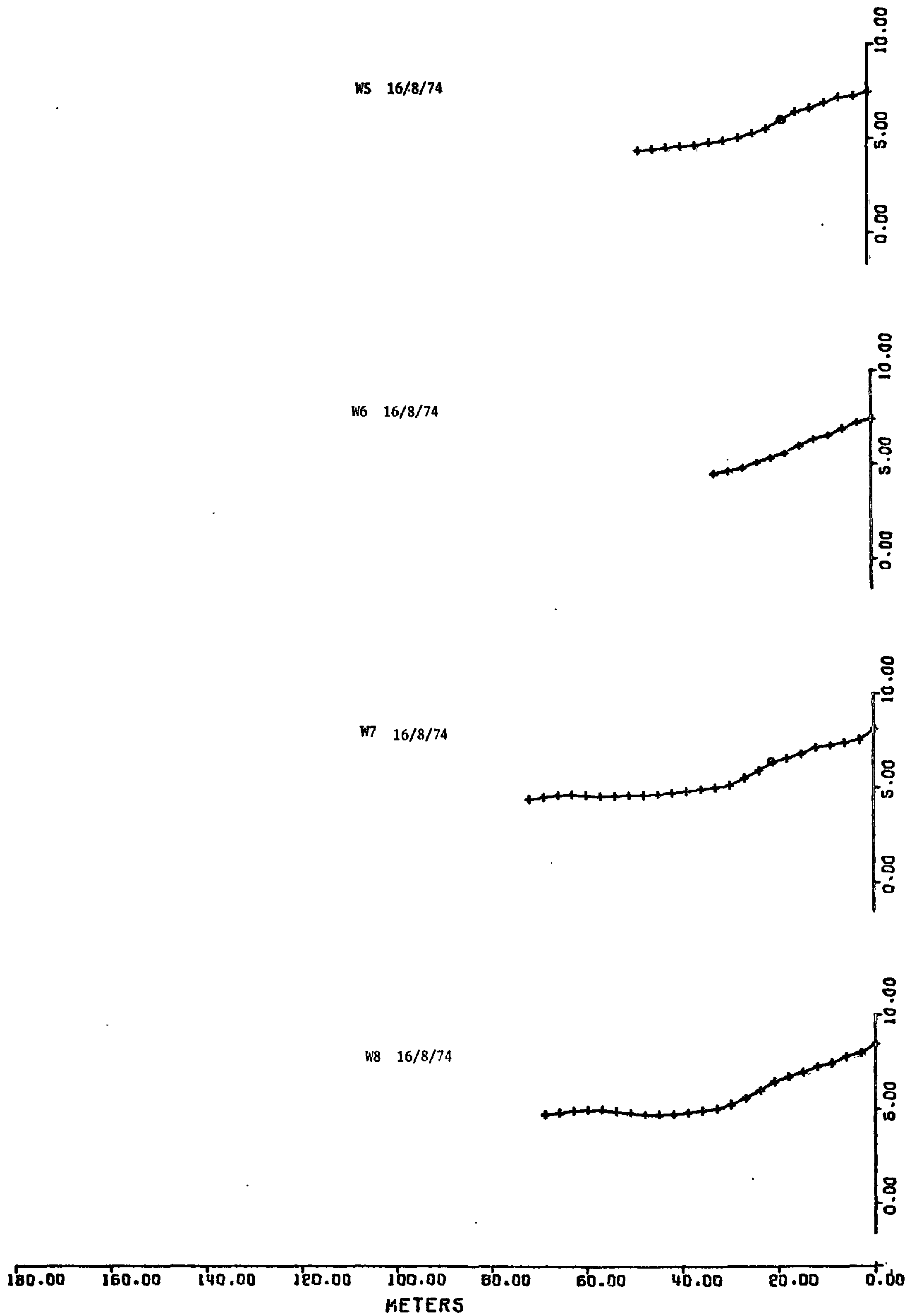
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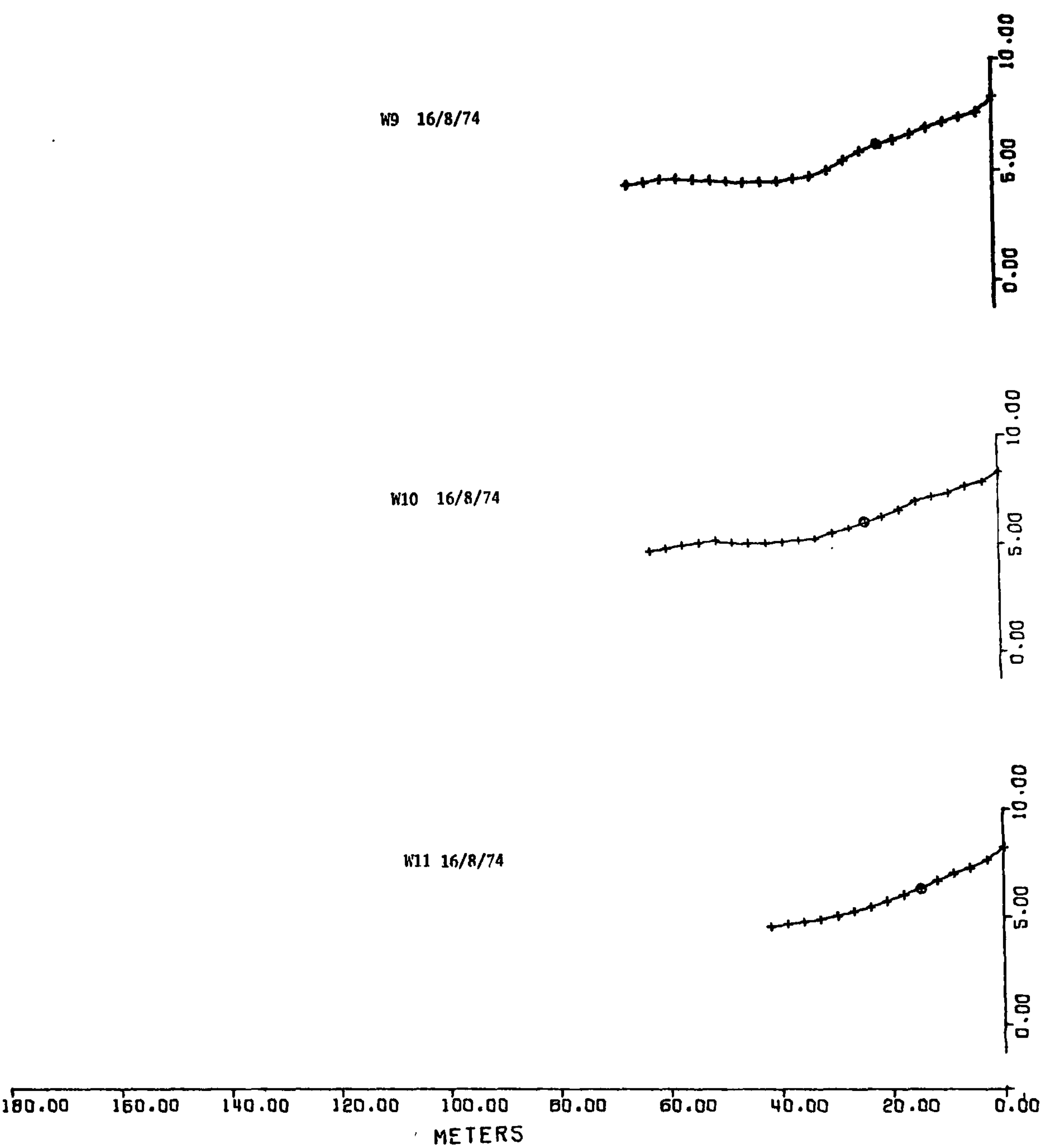

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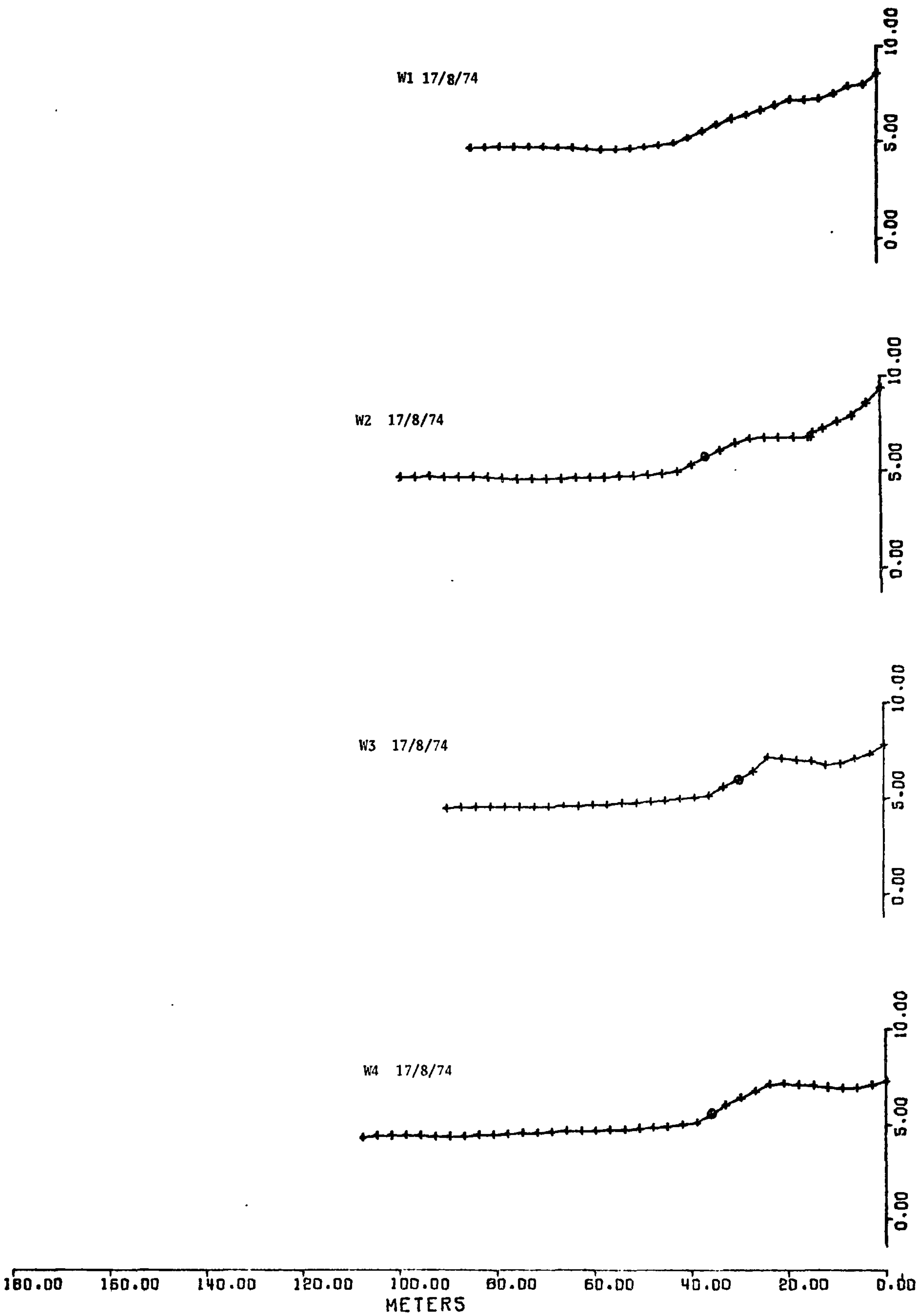
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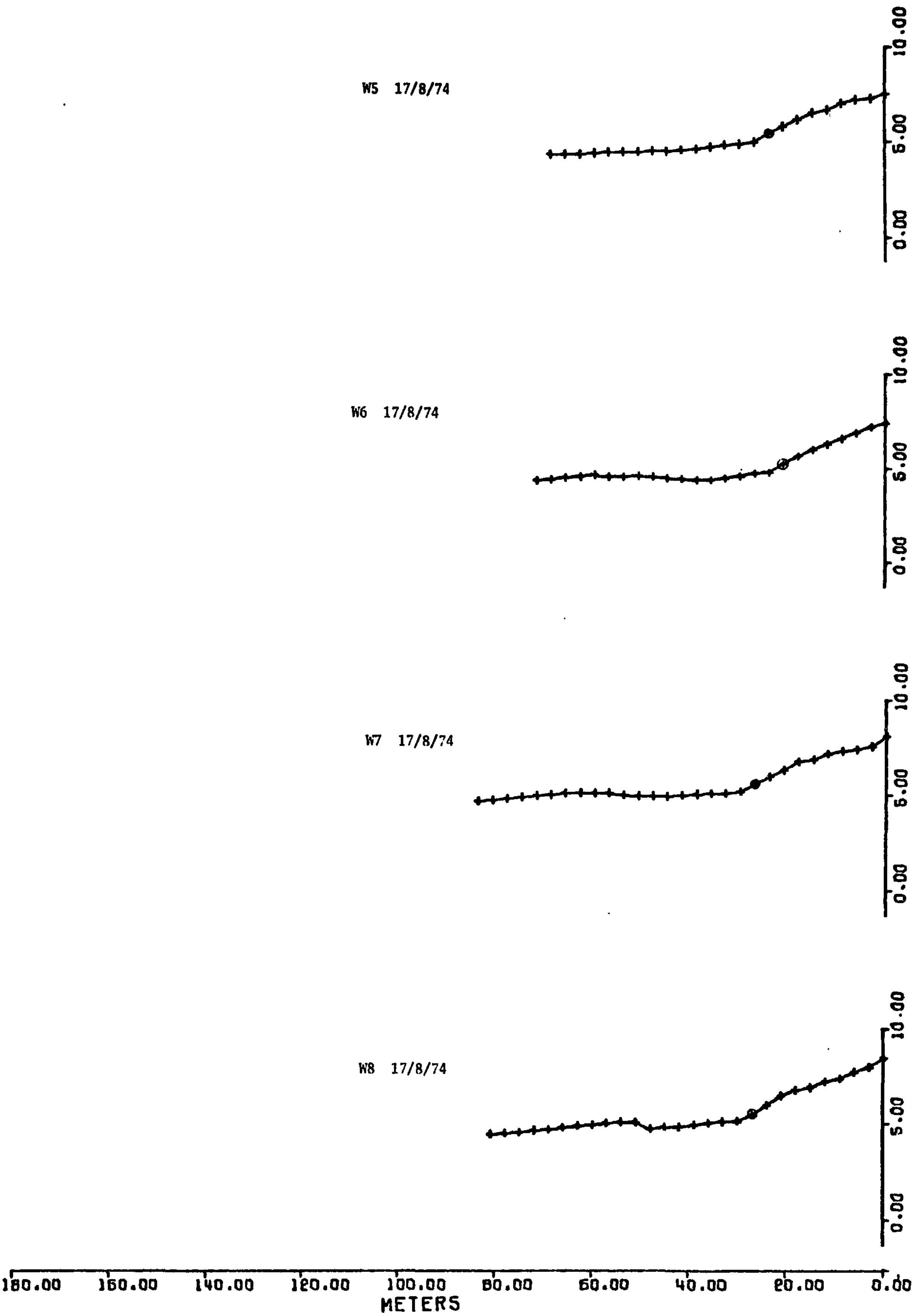
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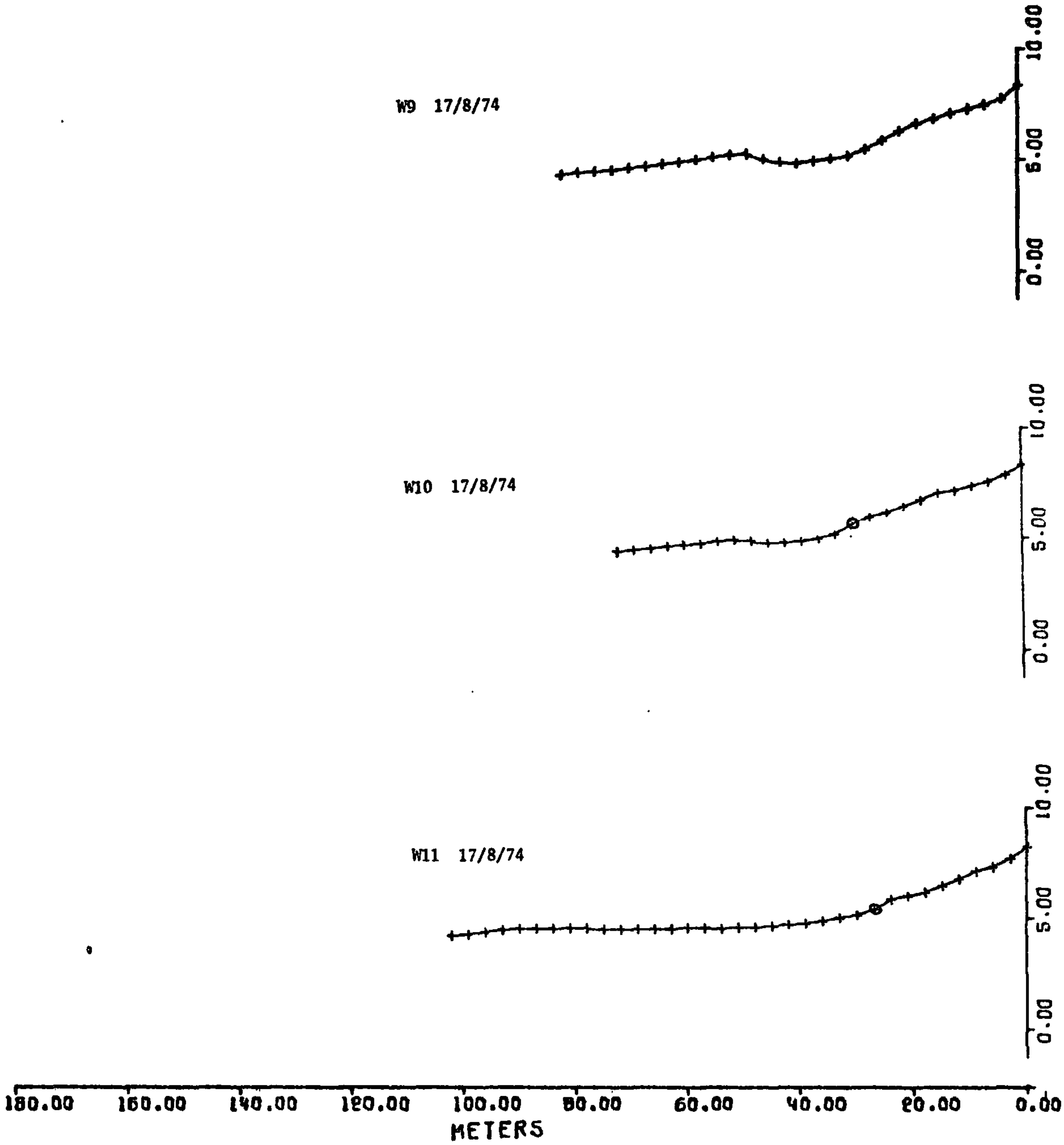
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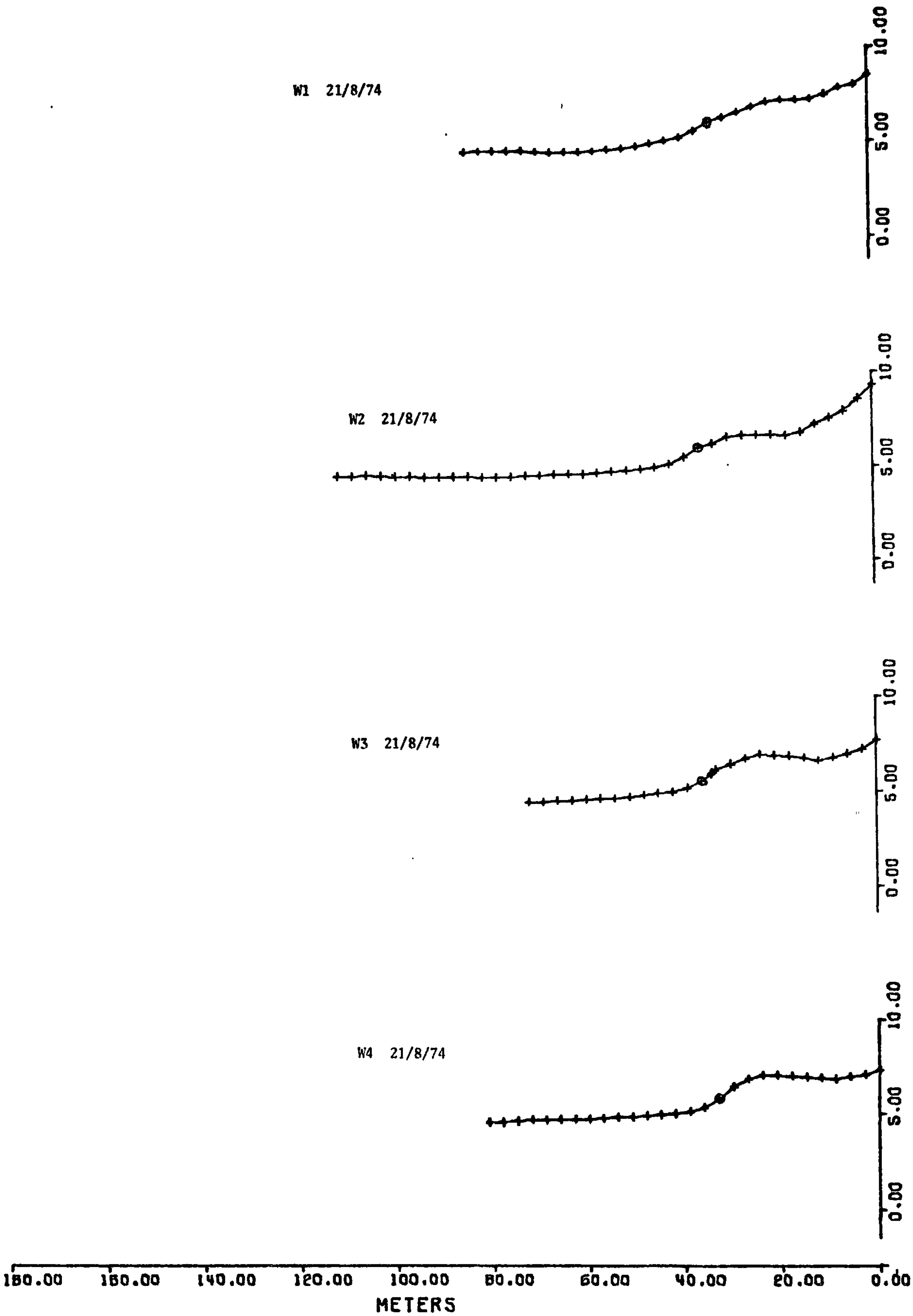

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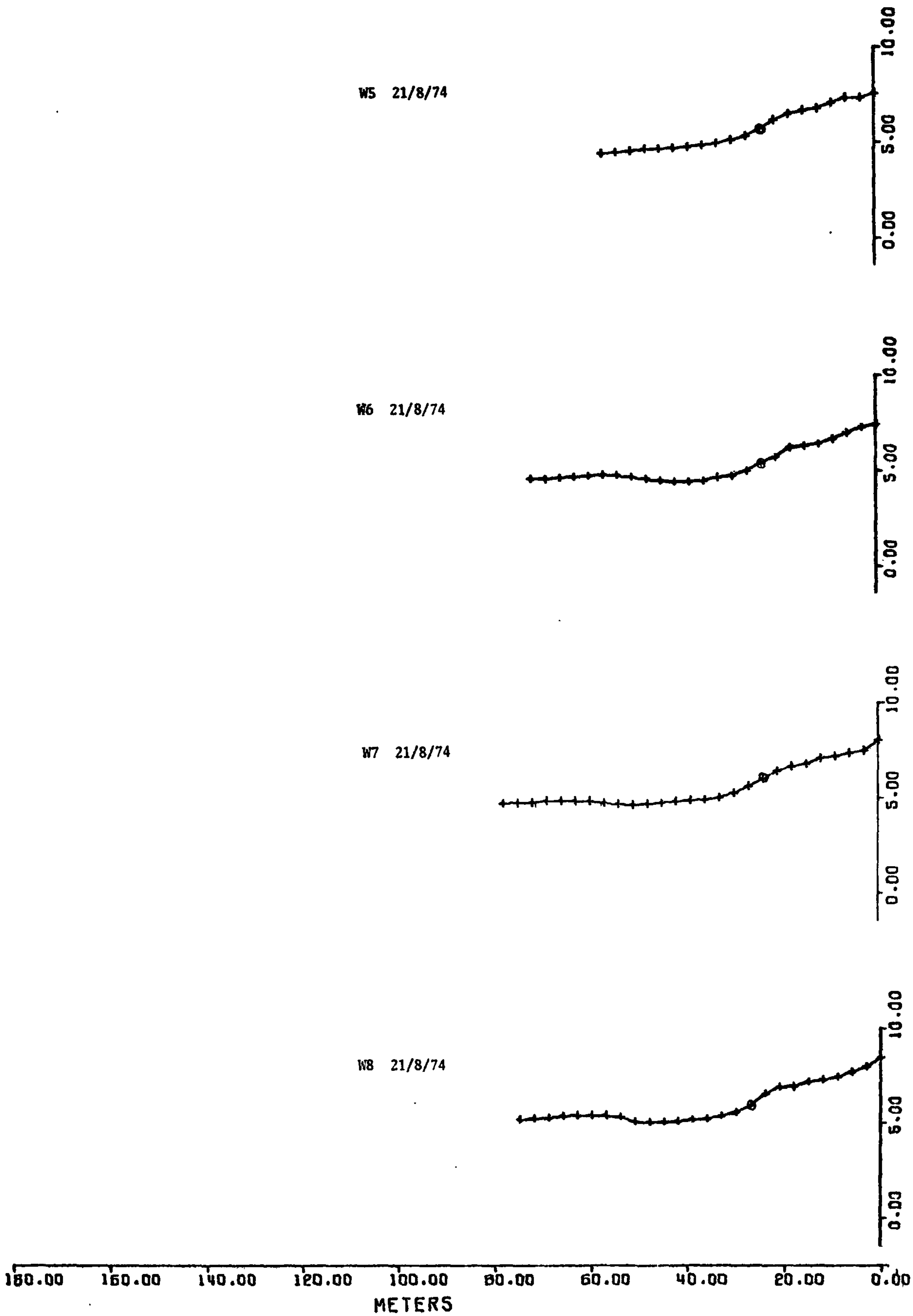
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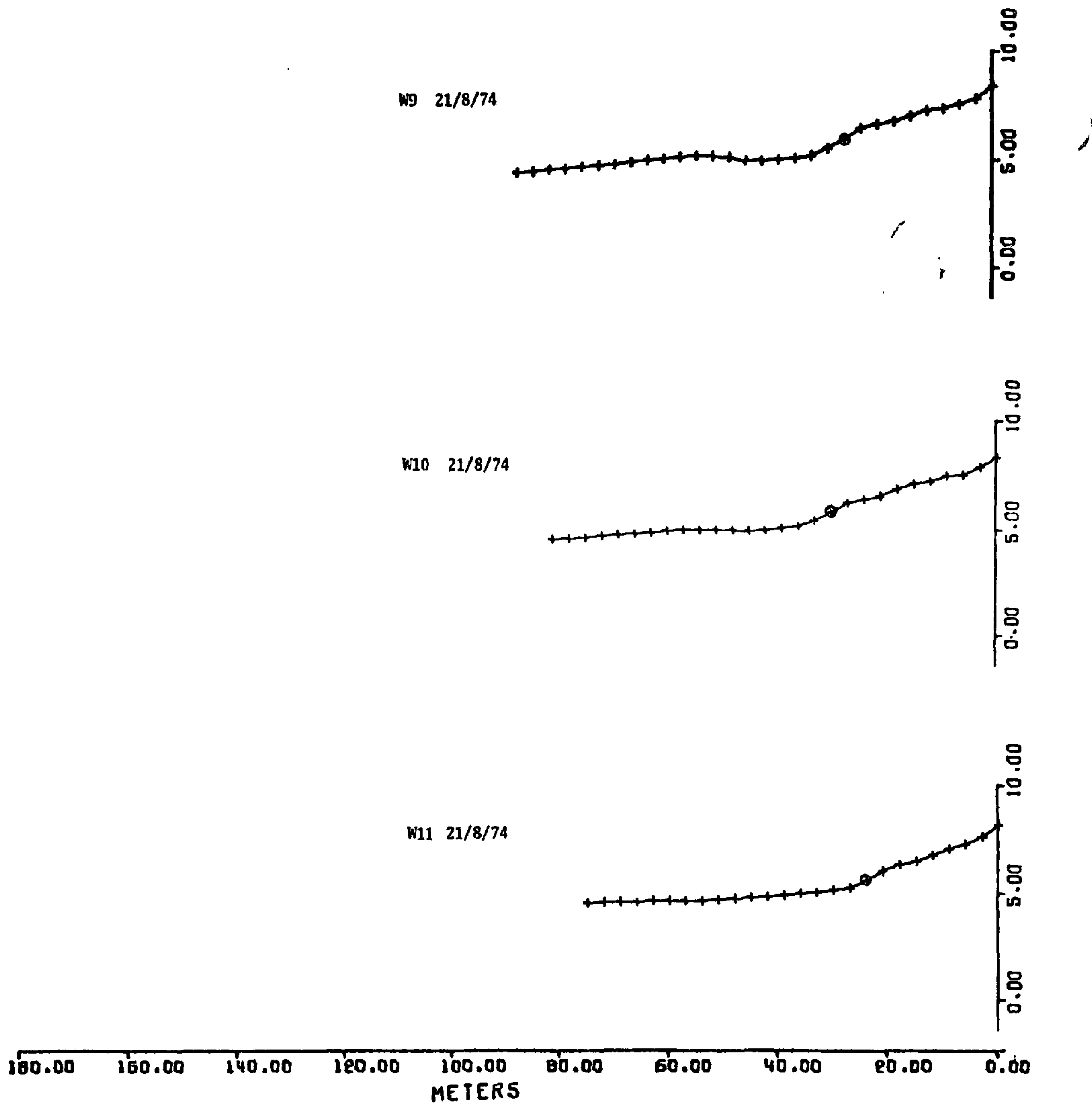

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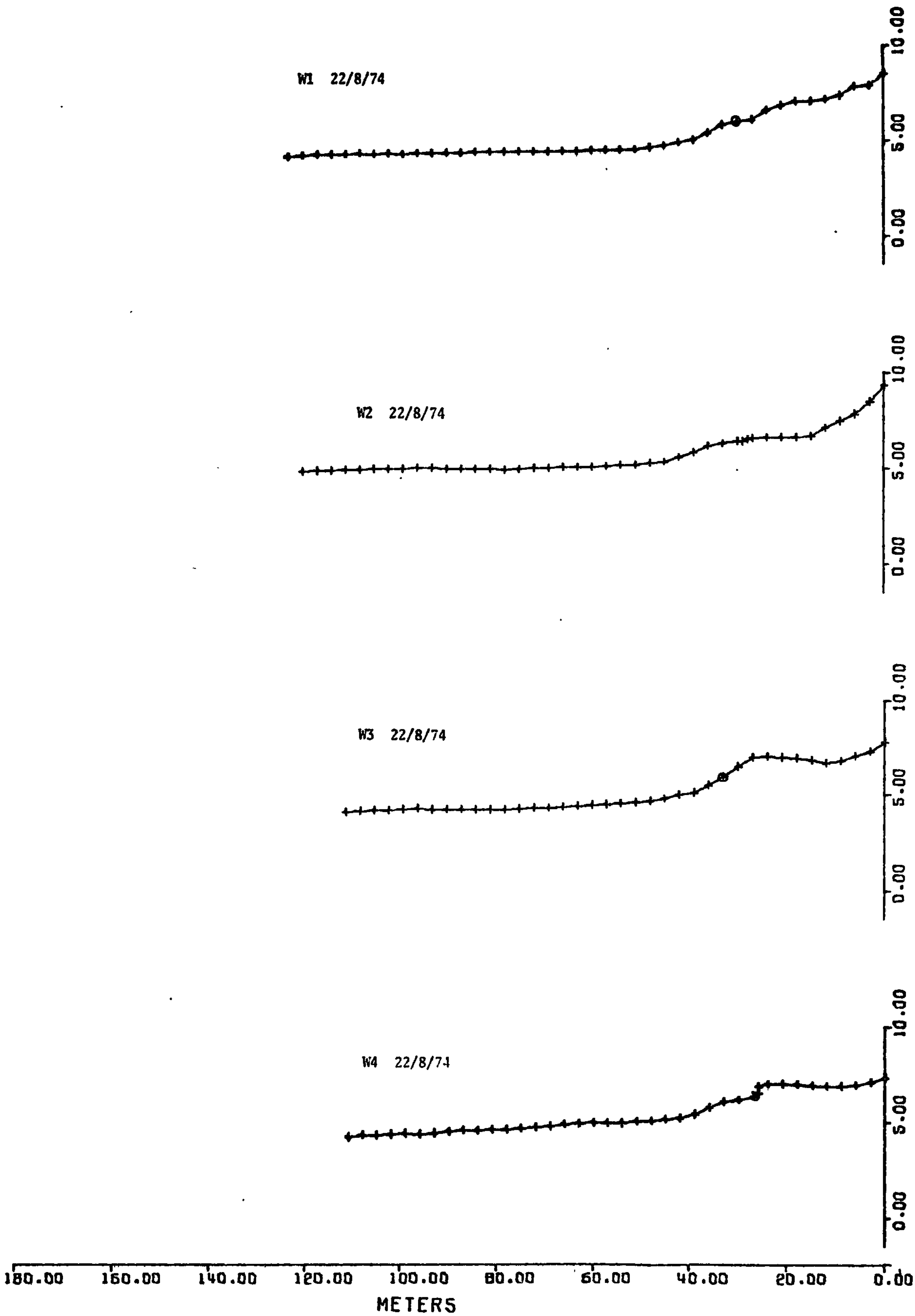
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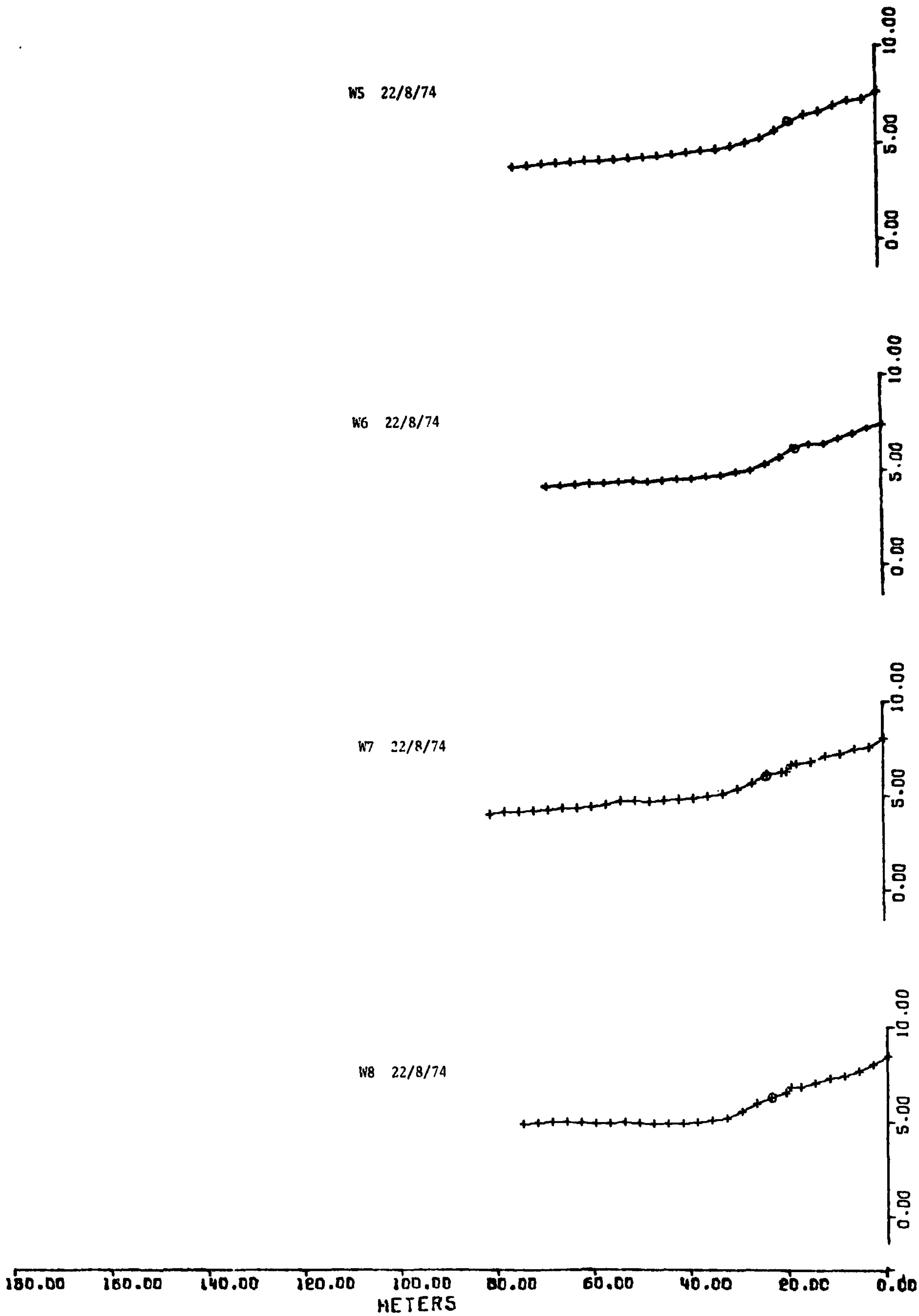
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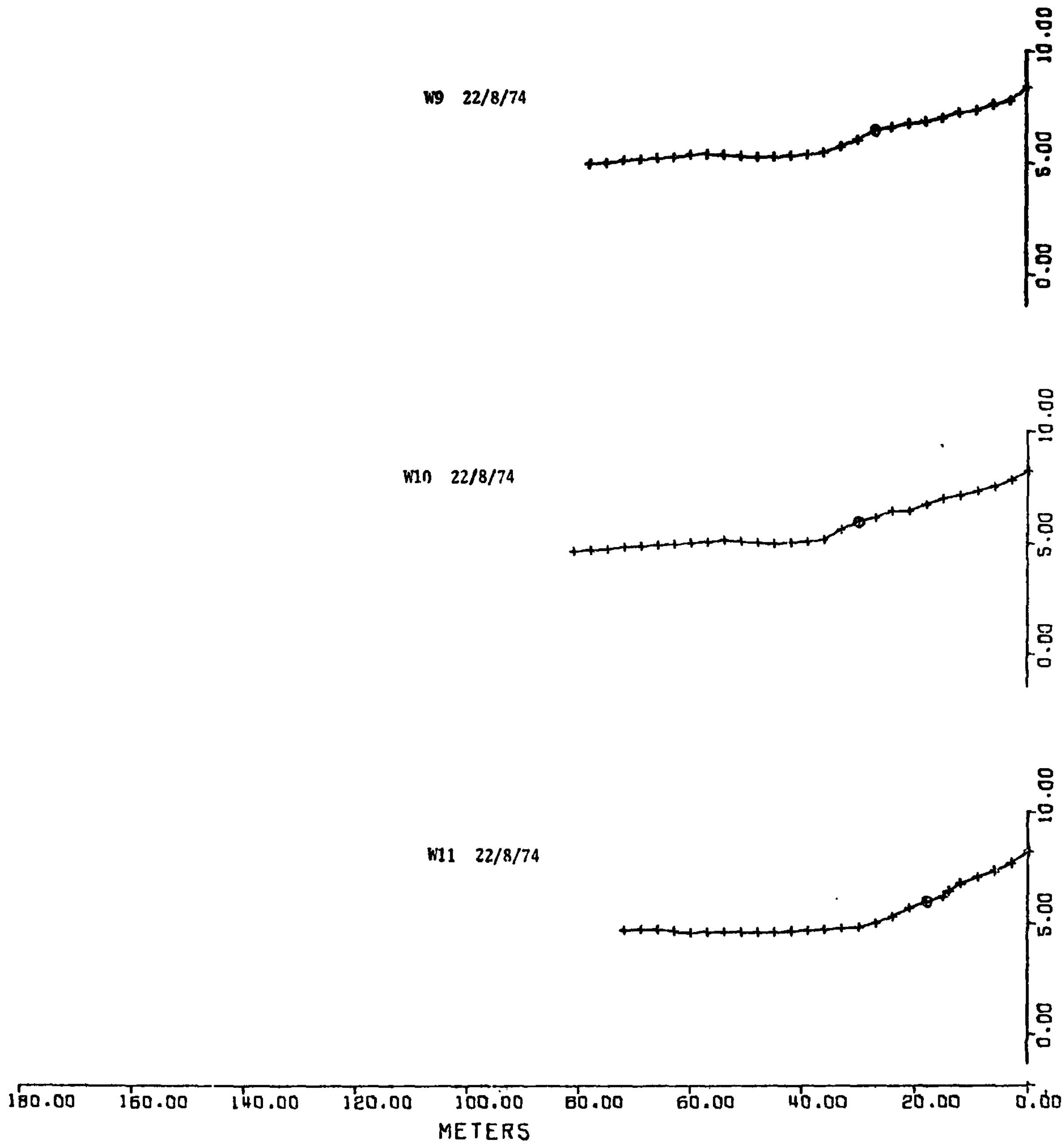
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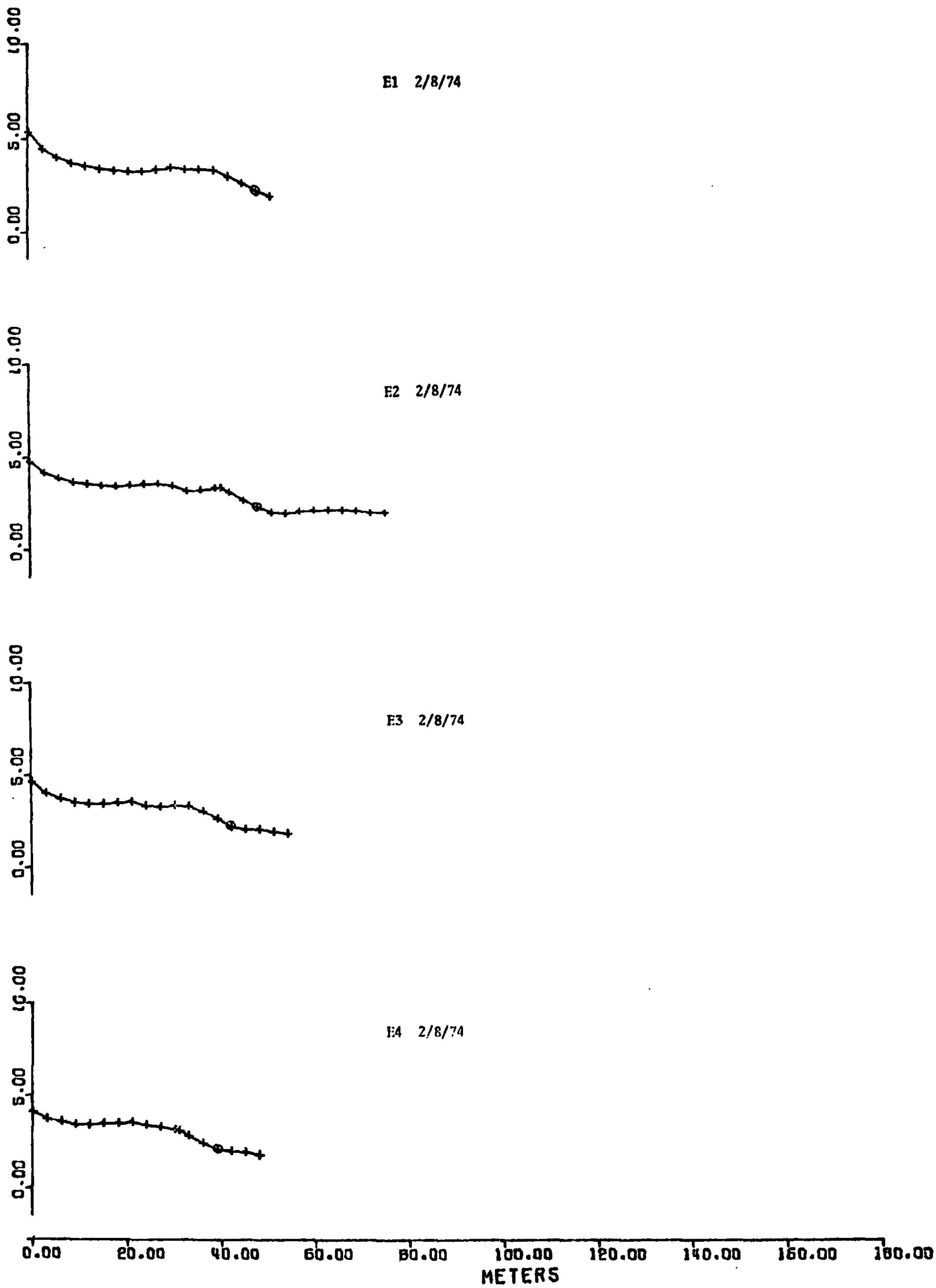
PROFILE PLOTS

Summer east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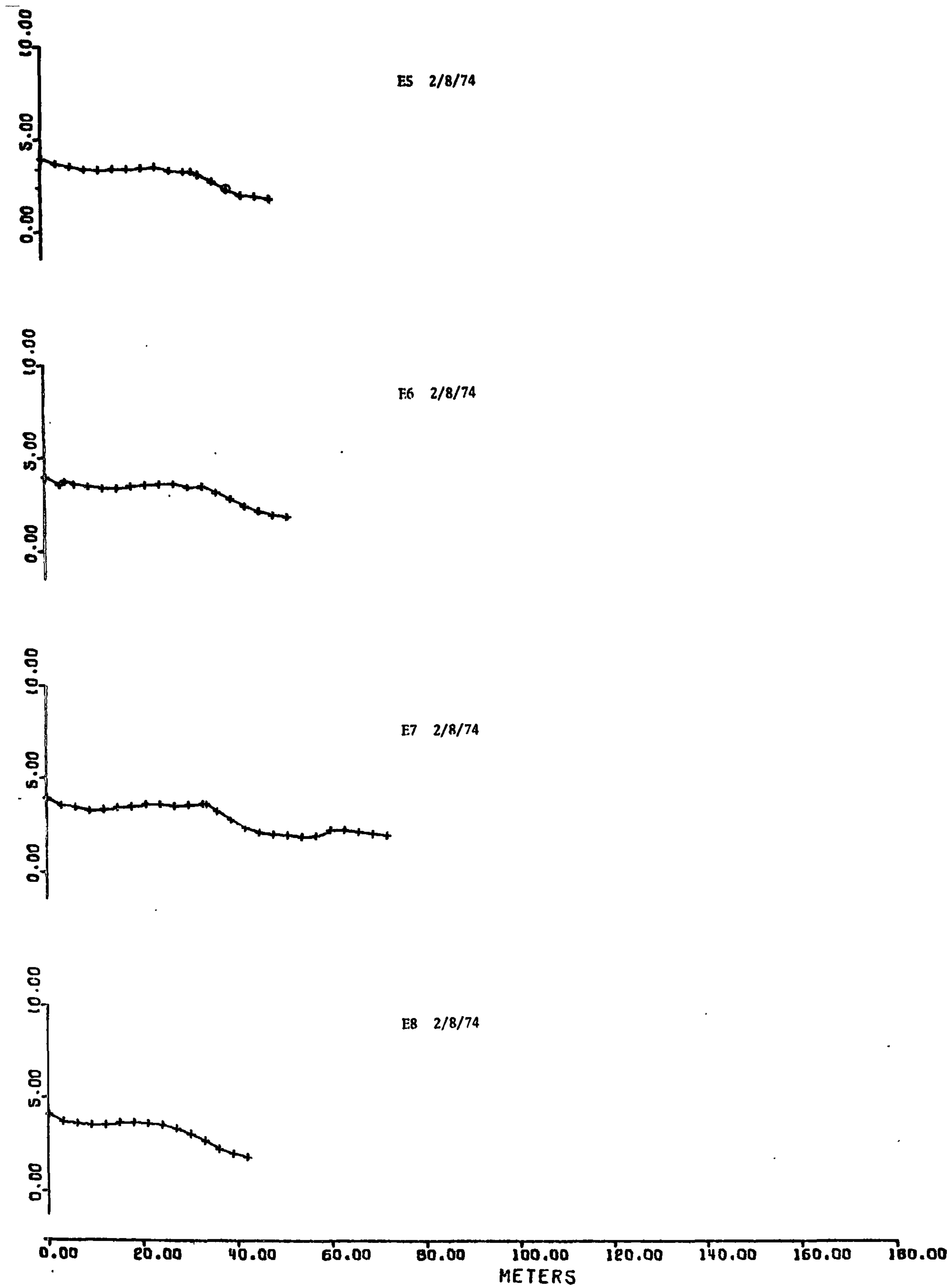
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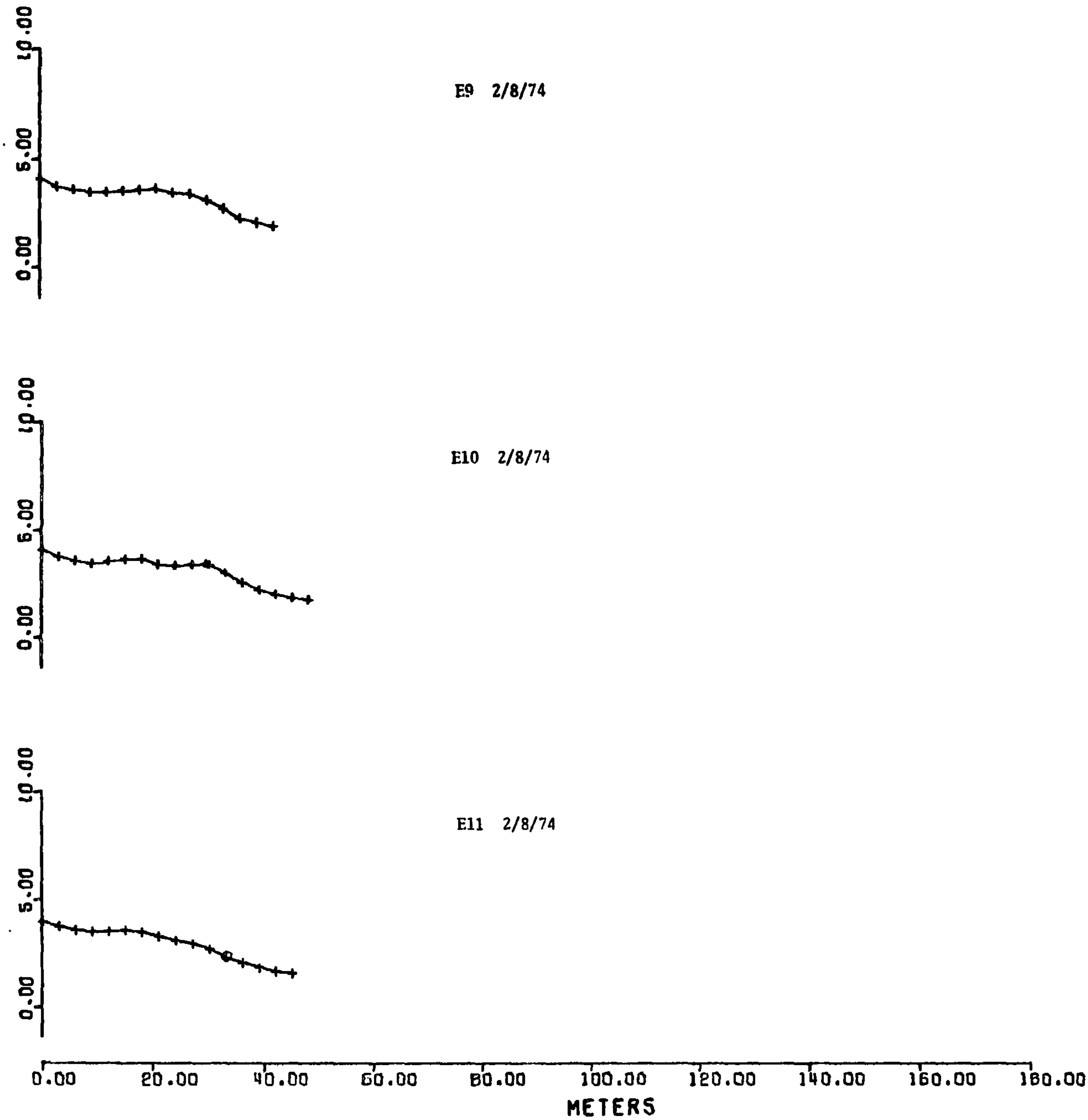
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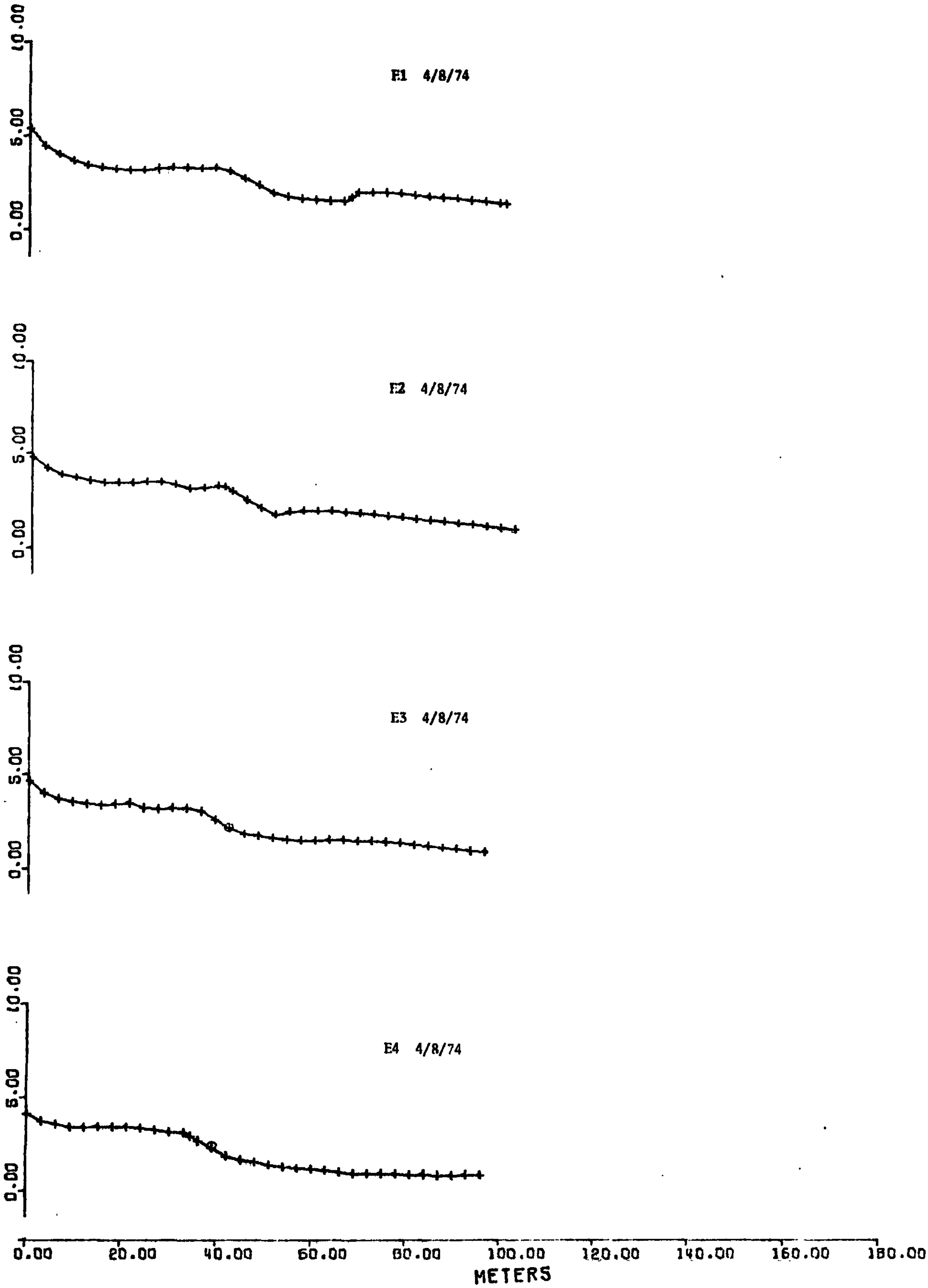

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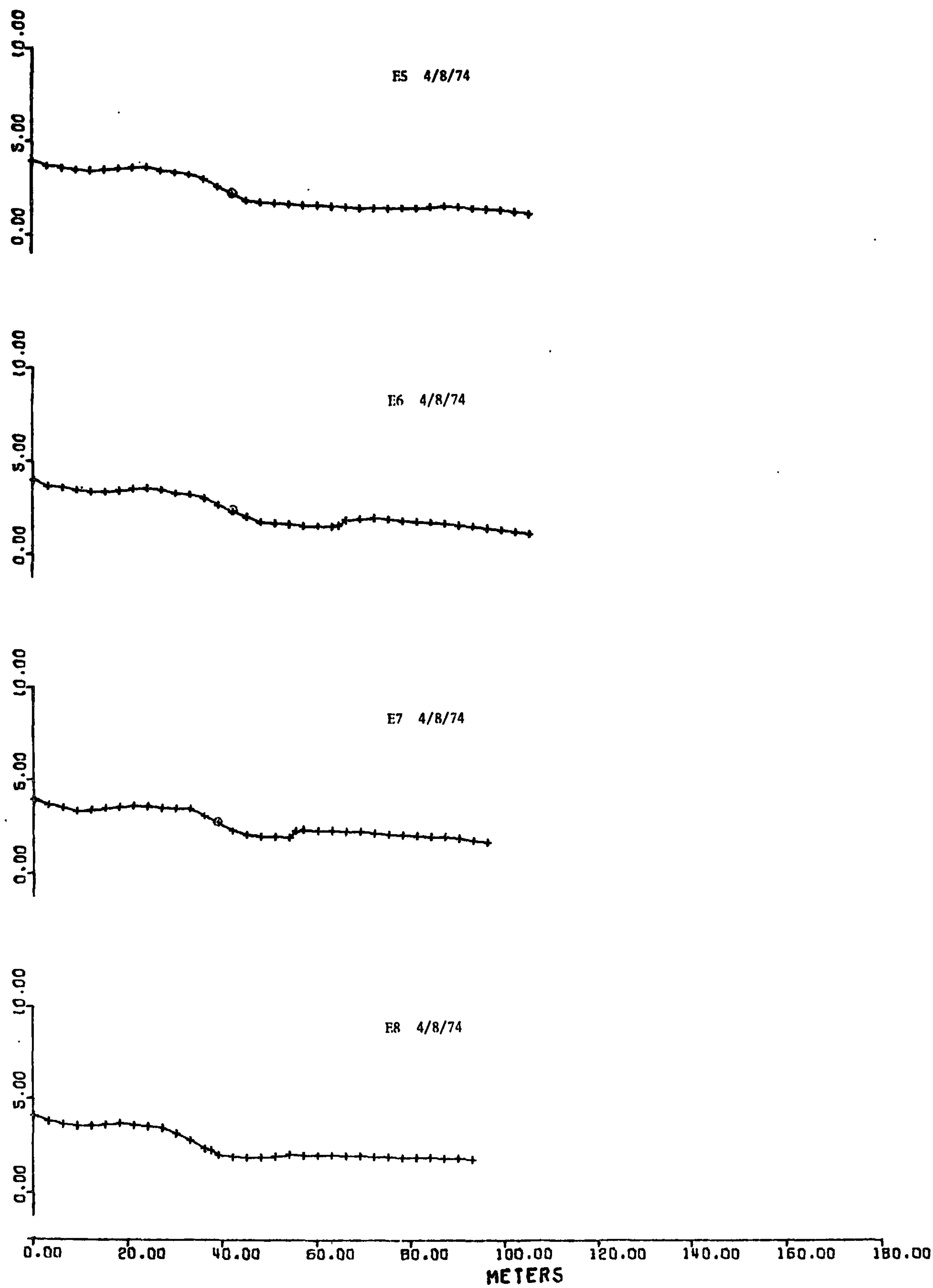
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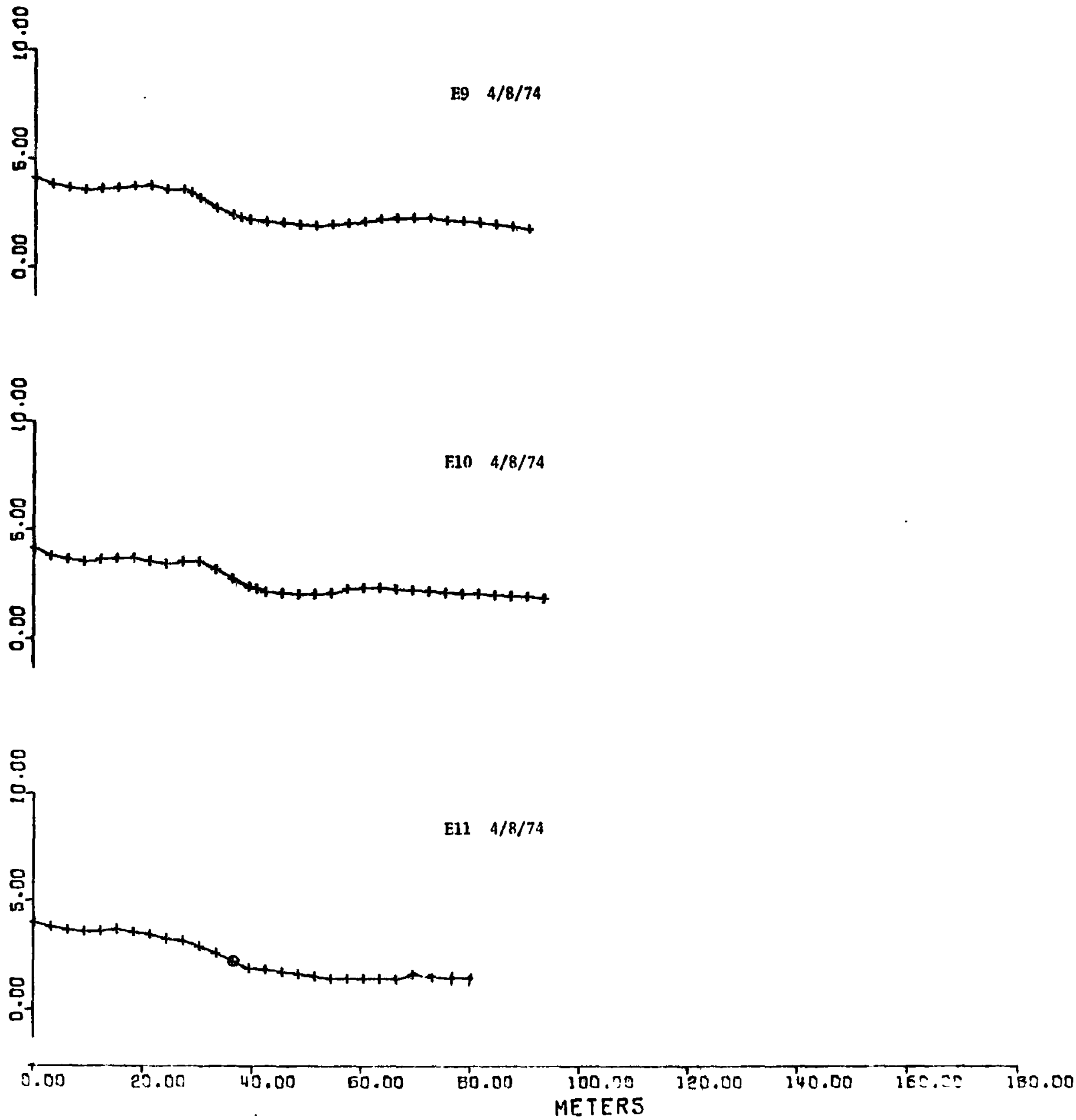
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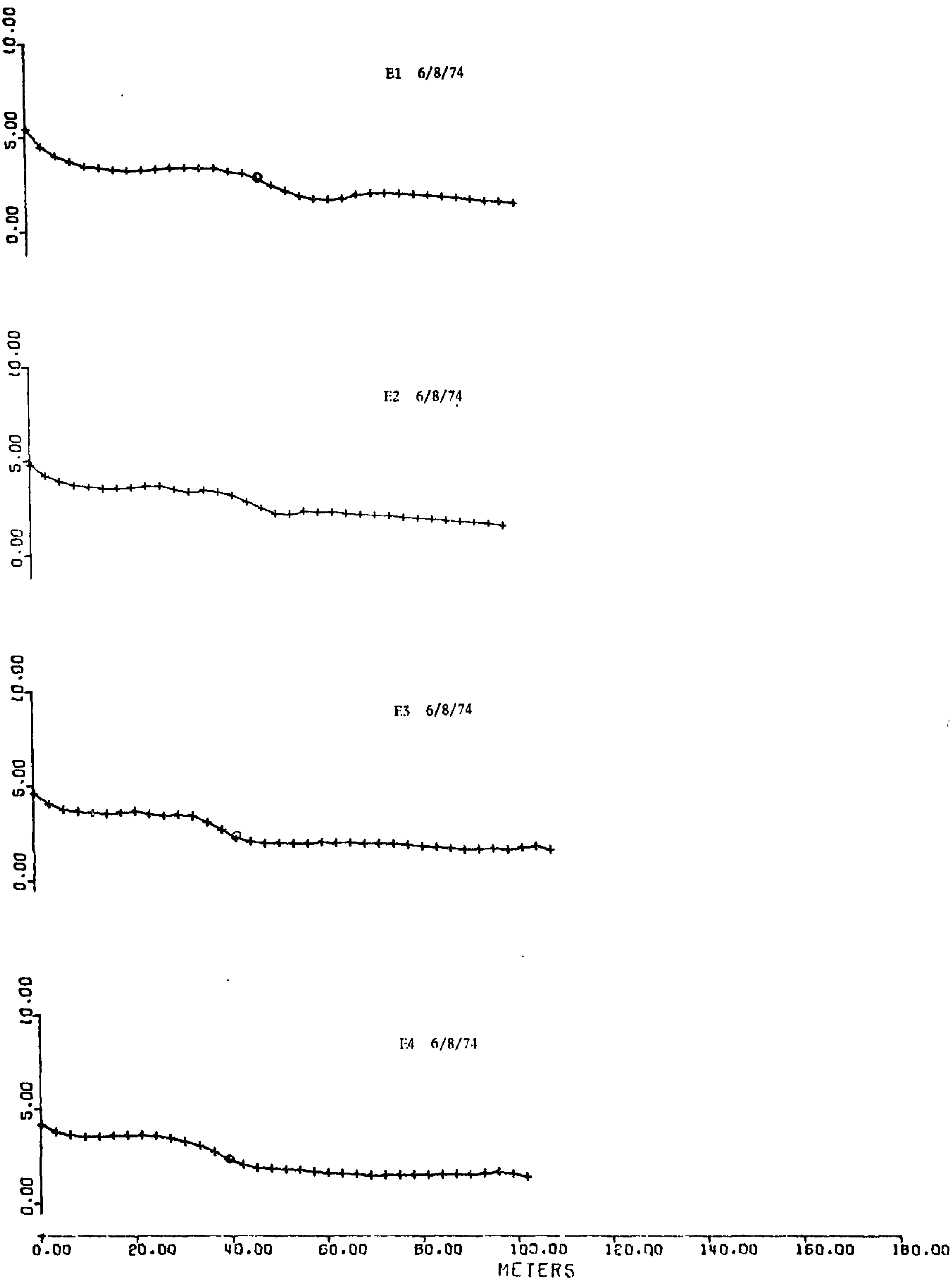
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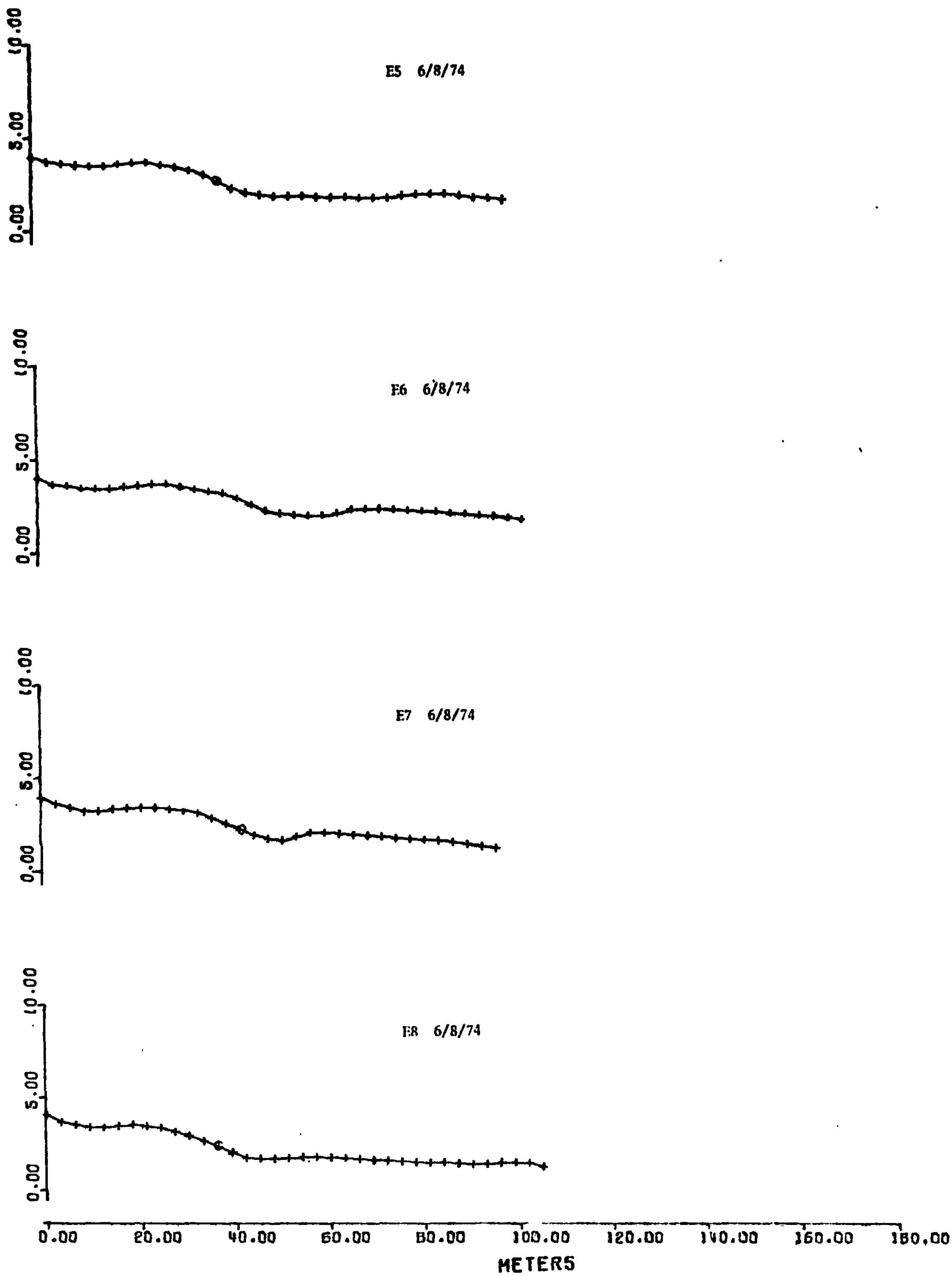
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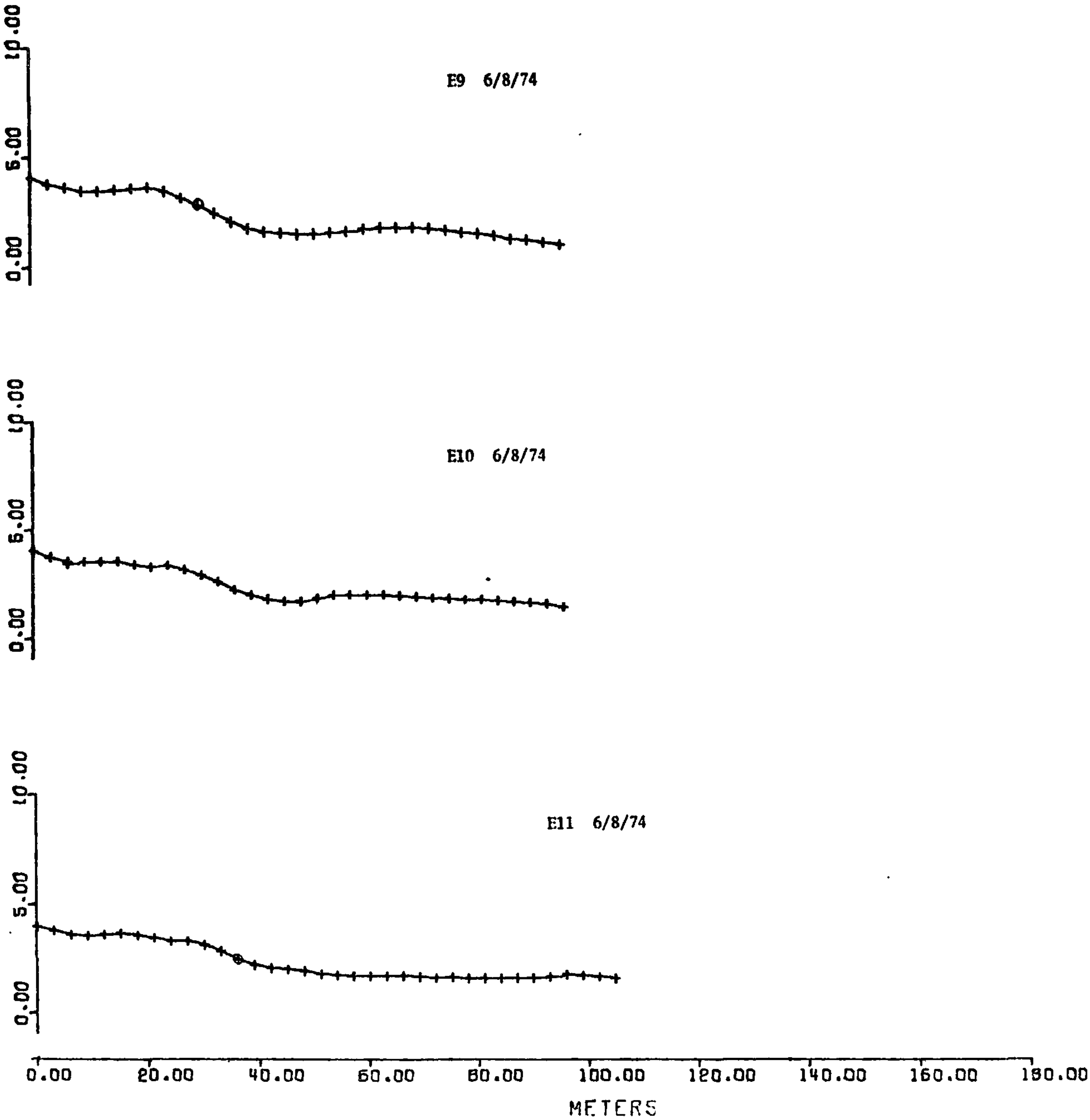
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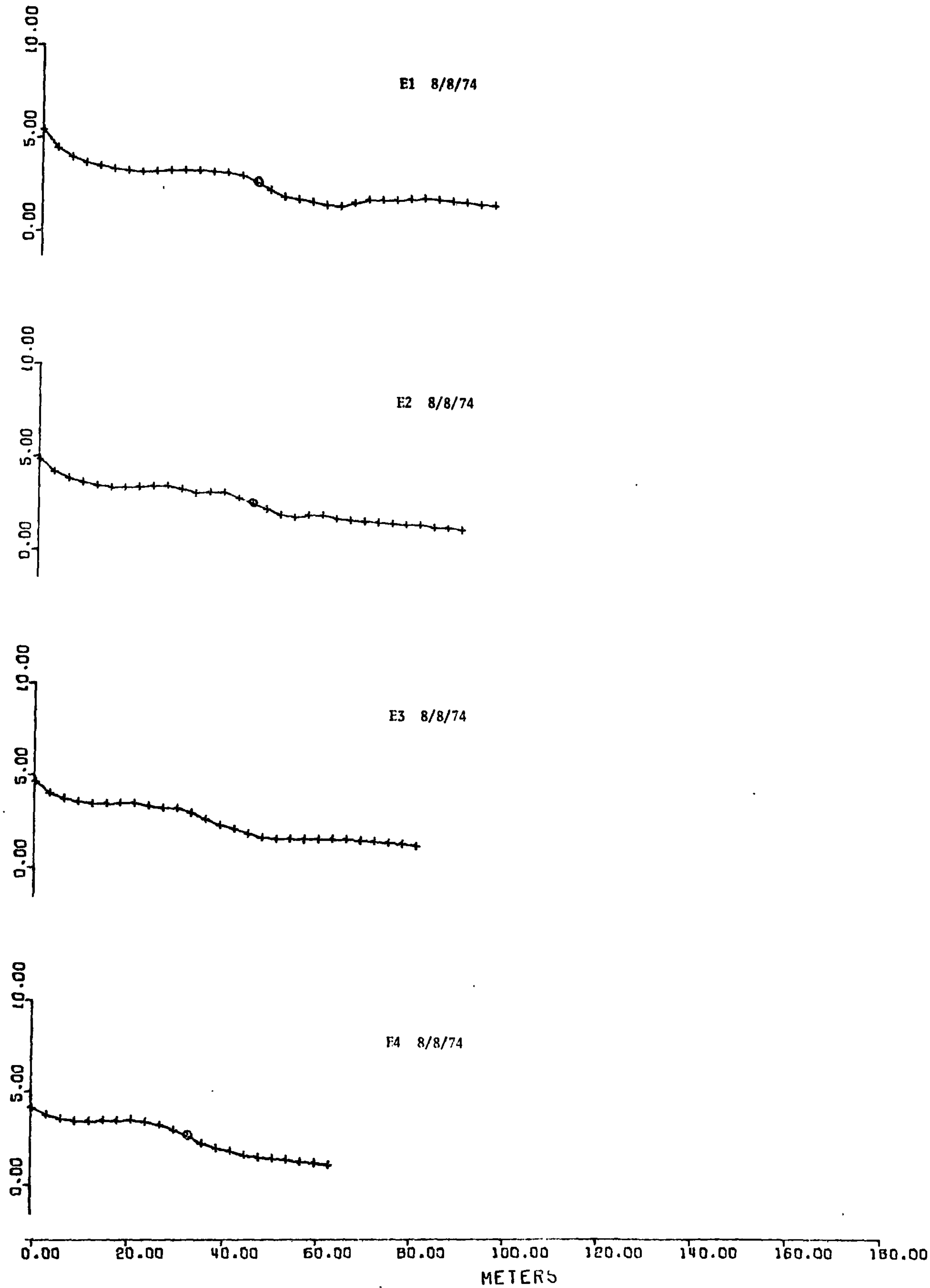
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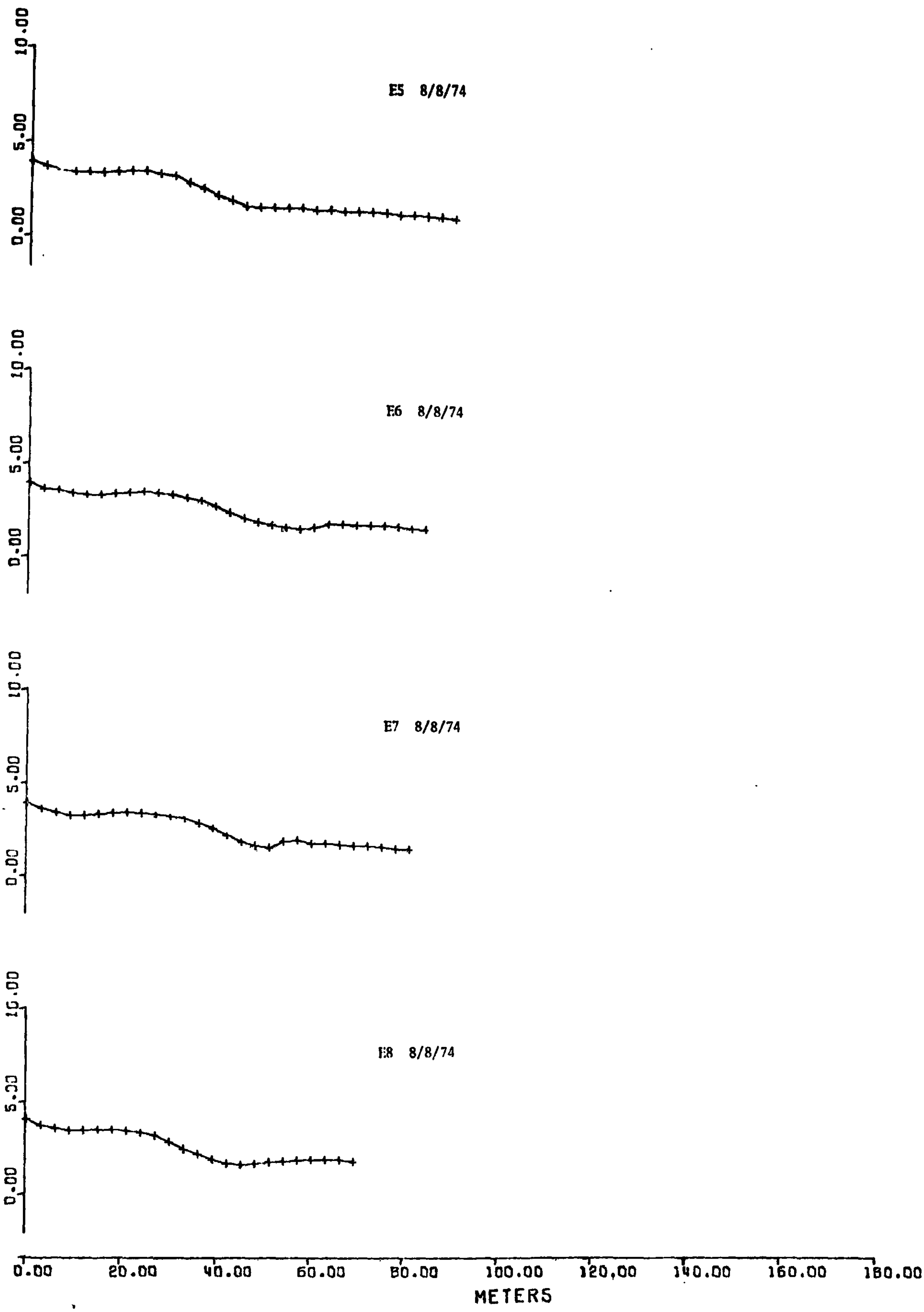
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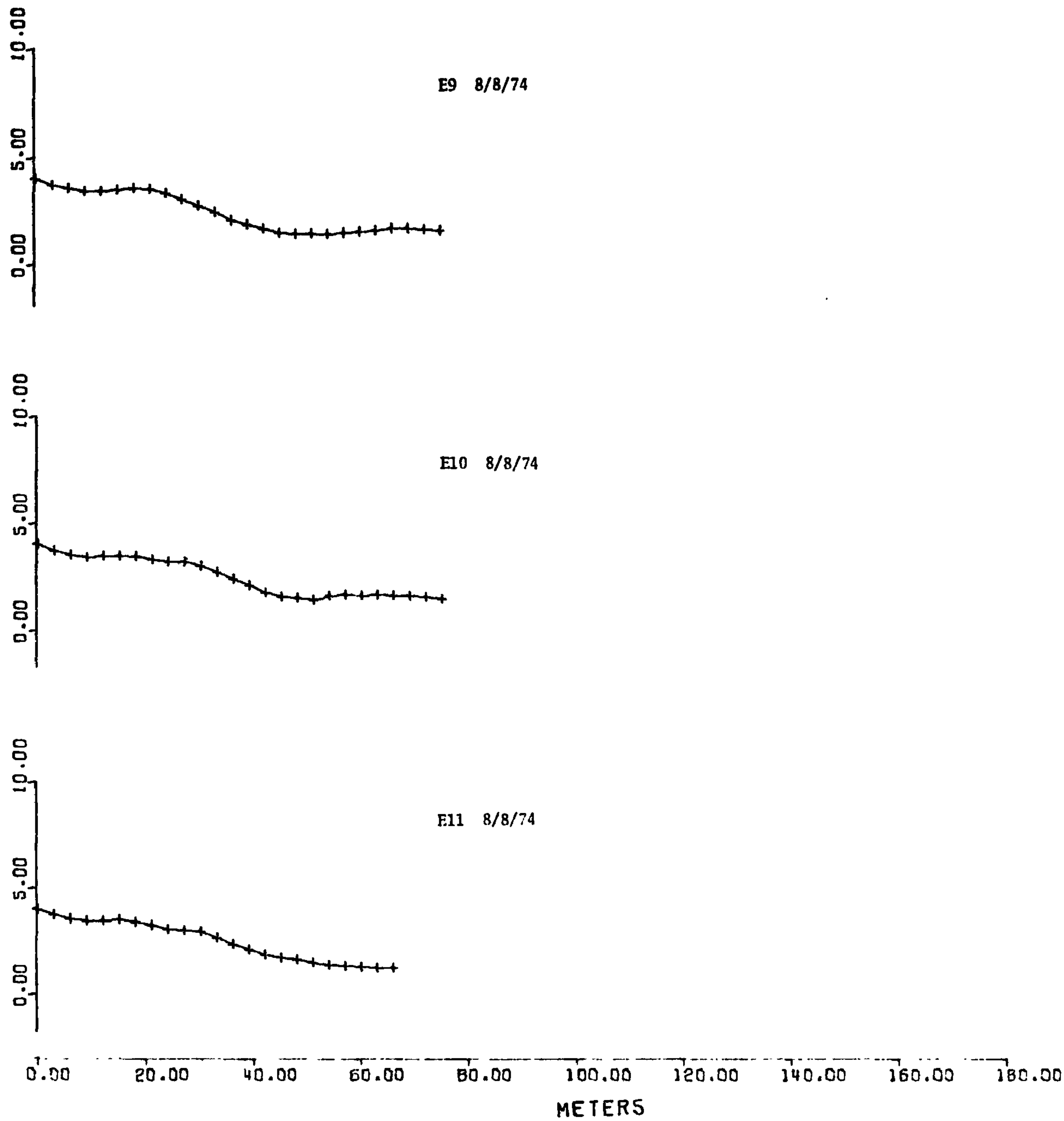
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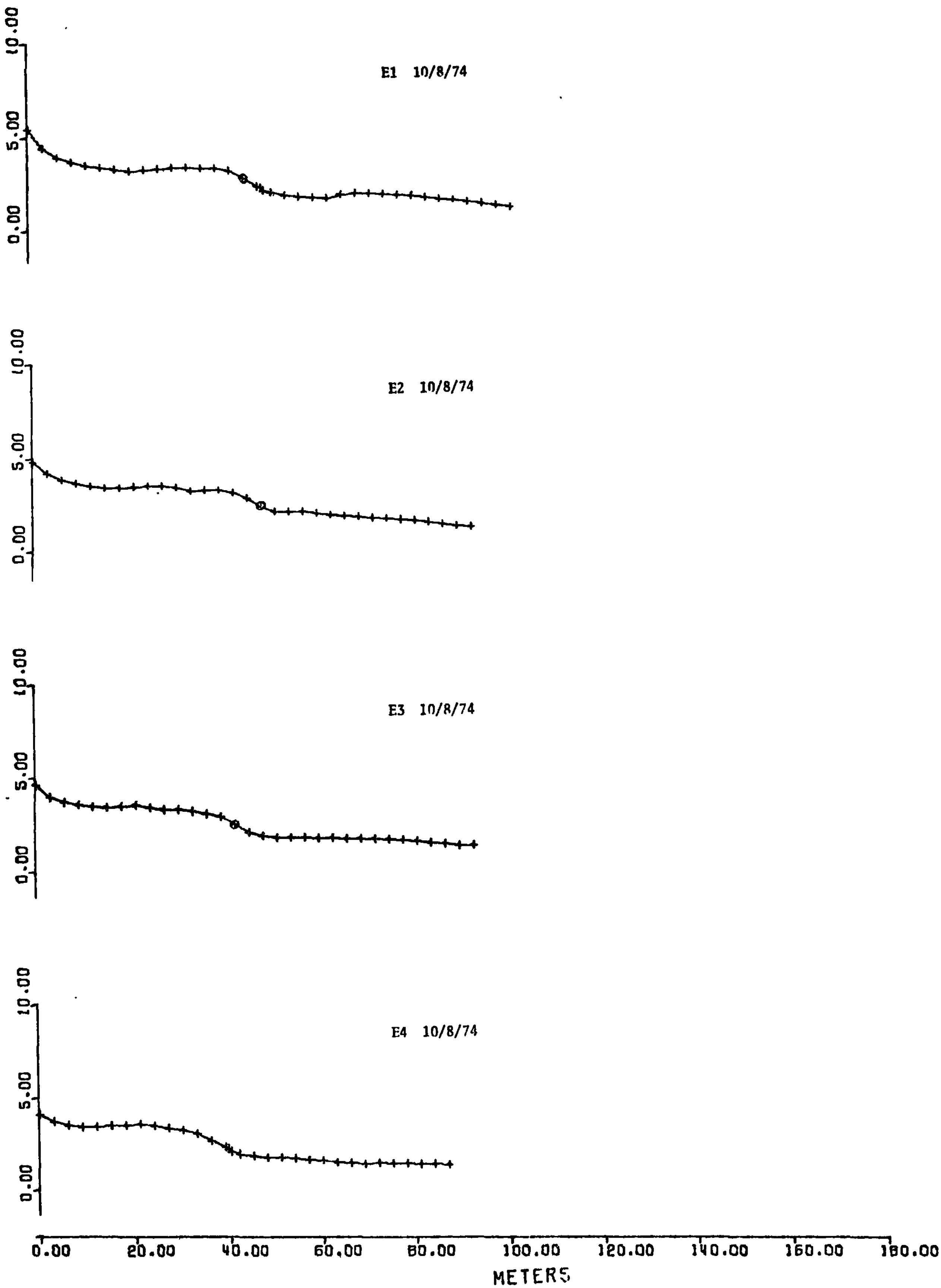
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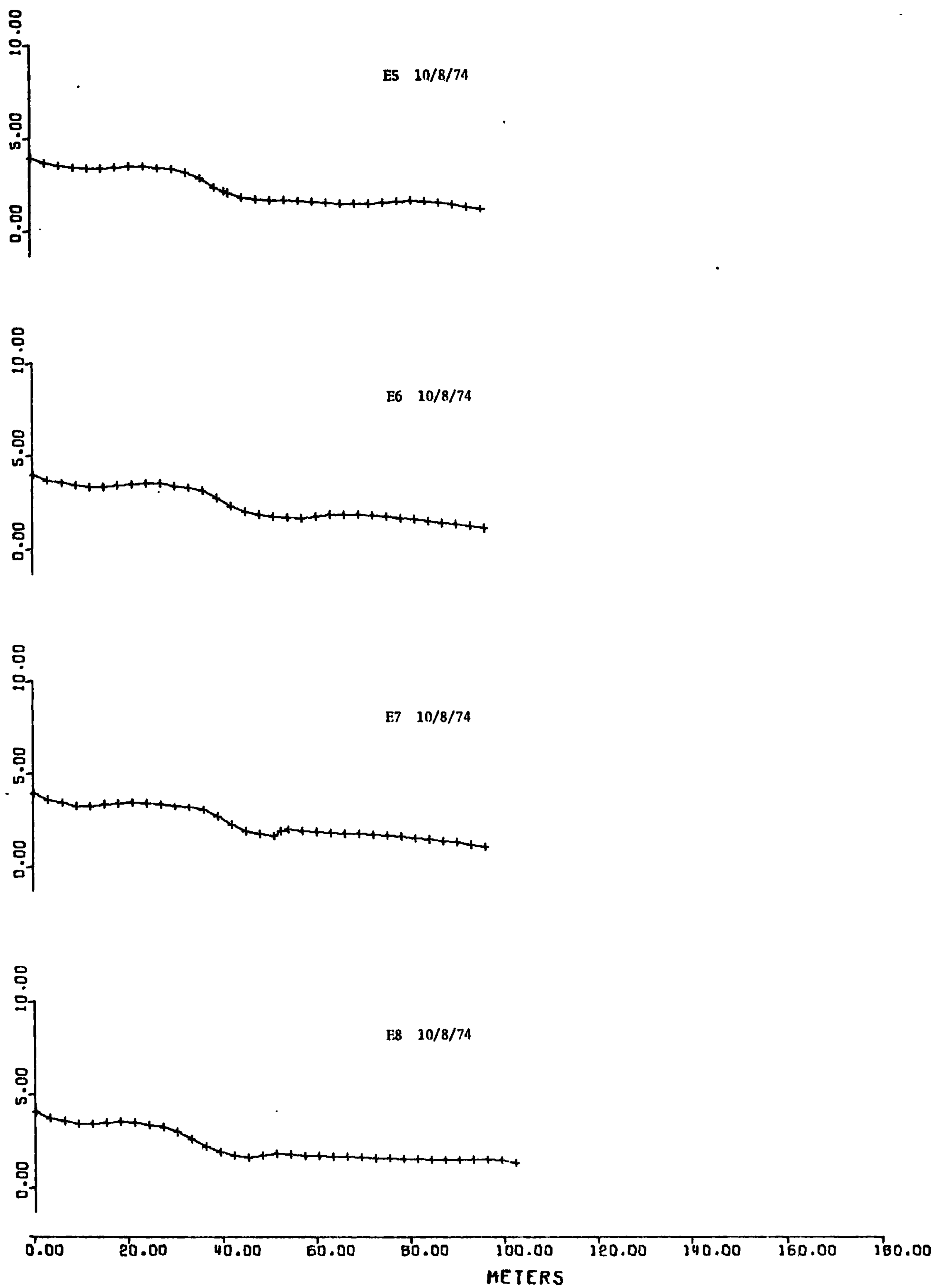

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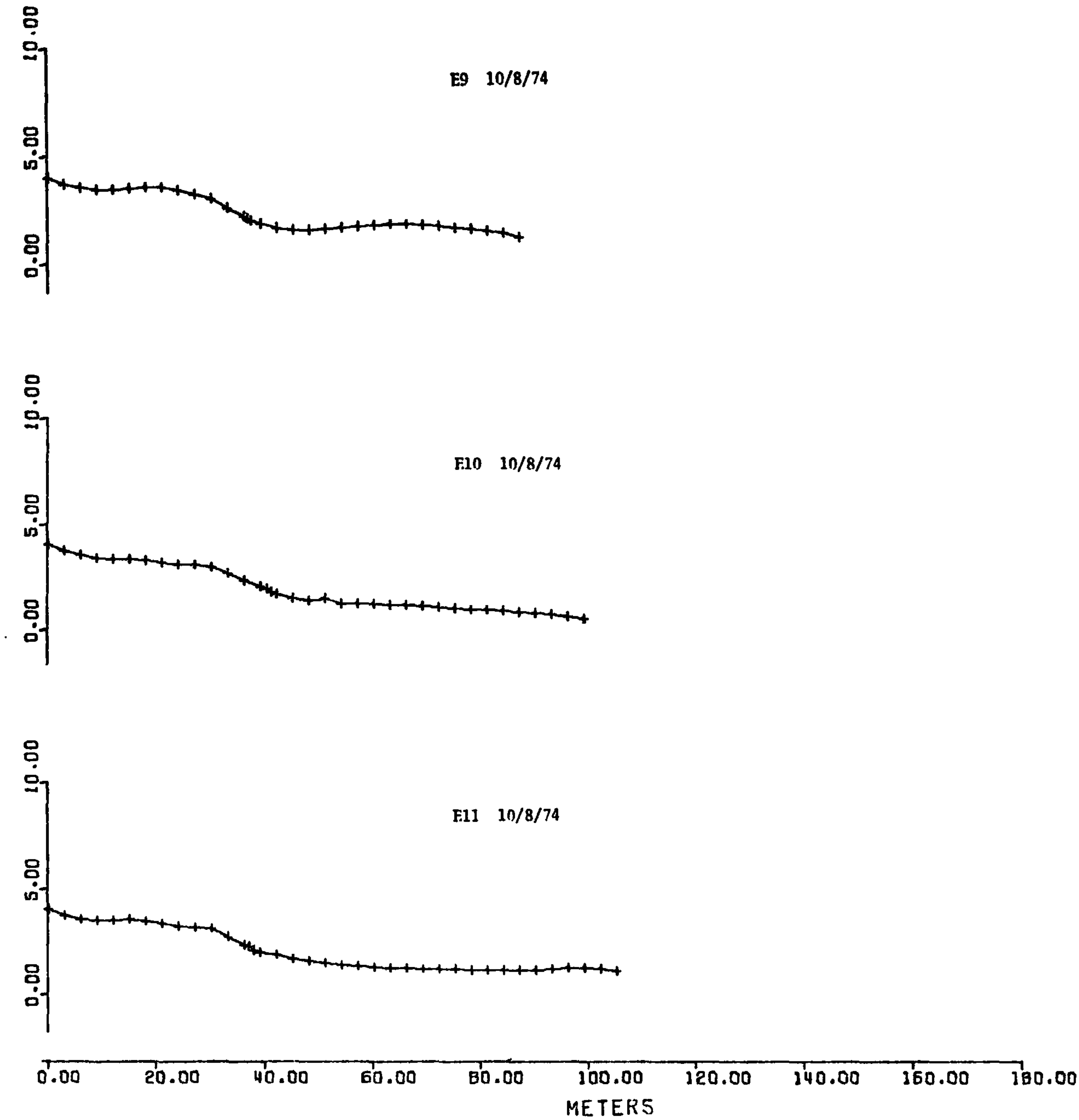
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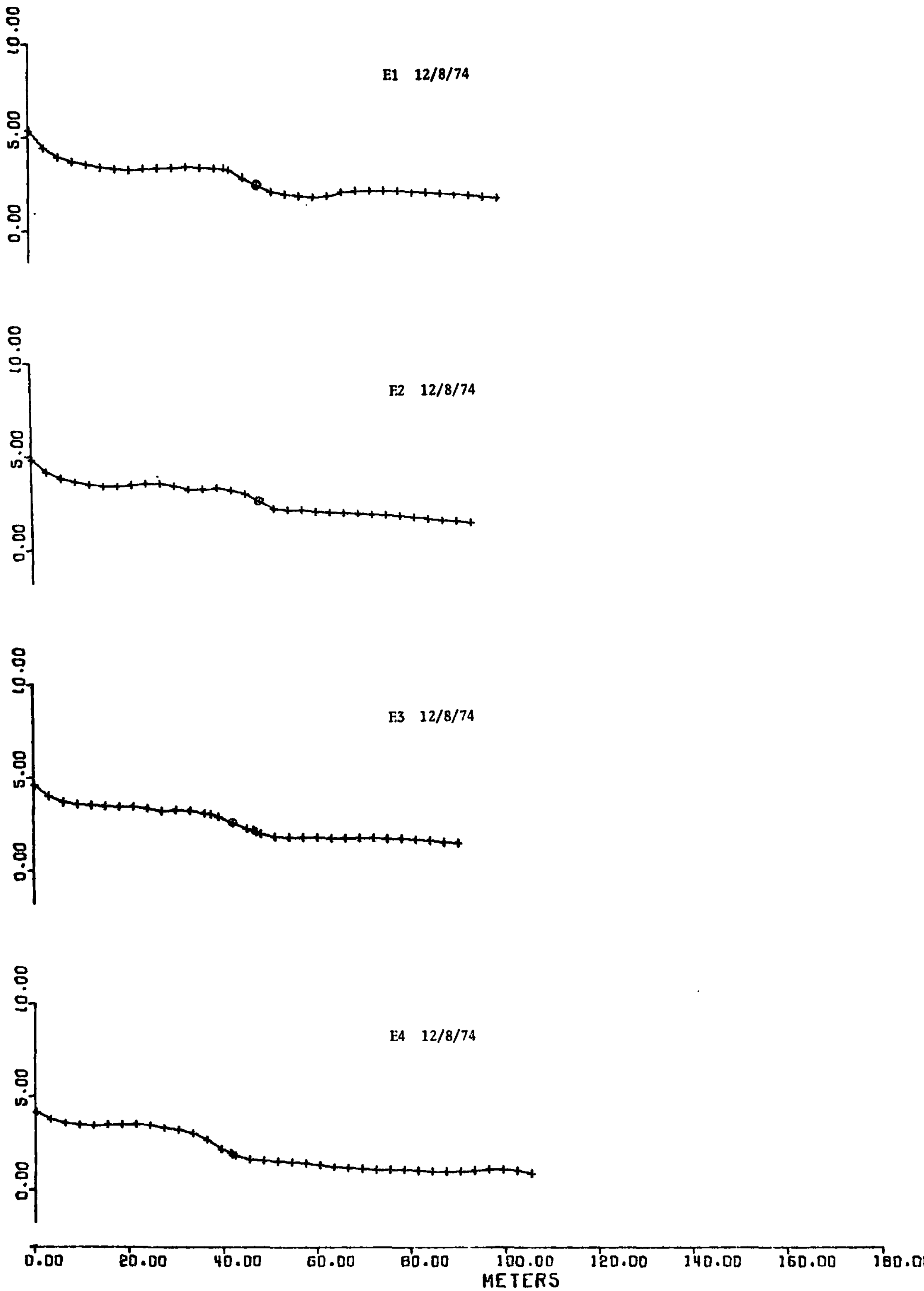
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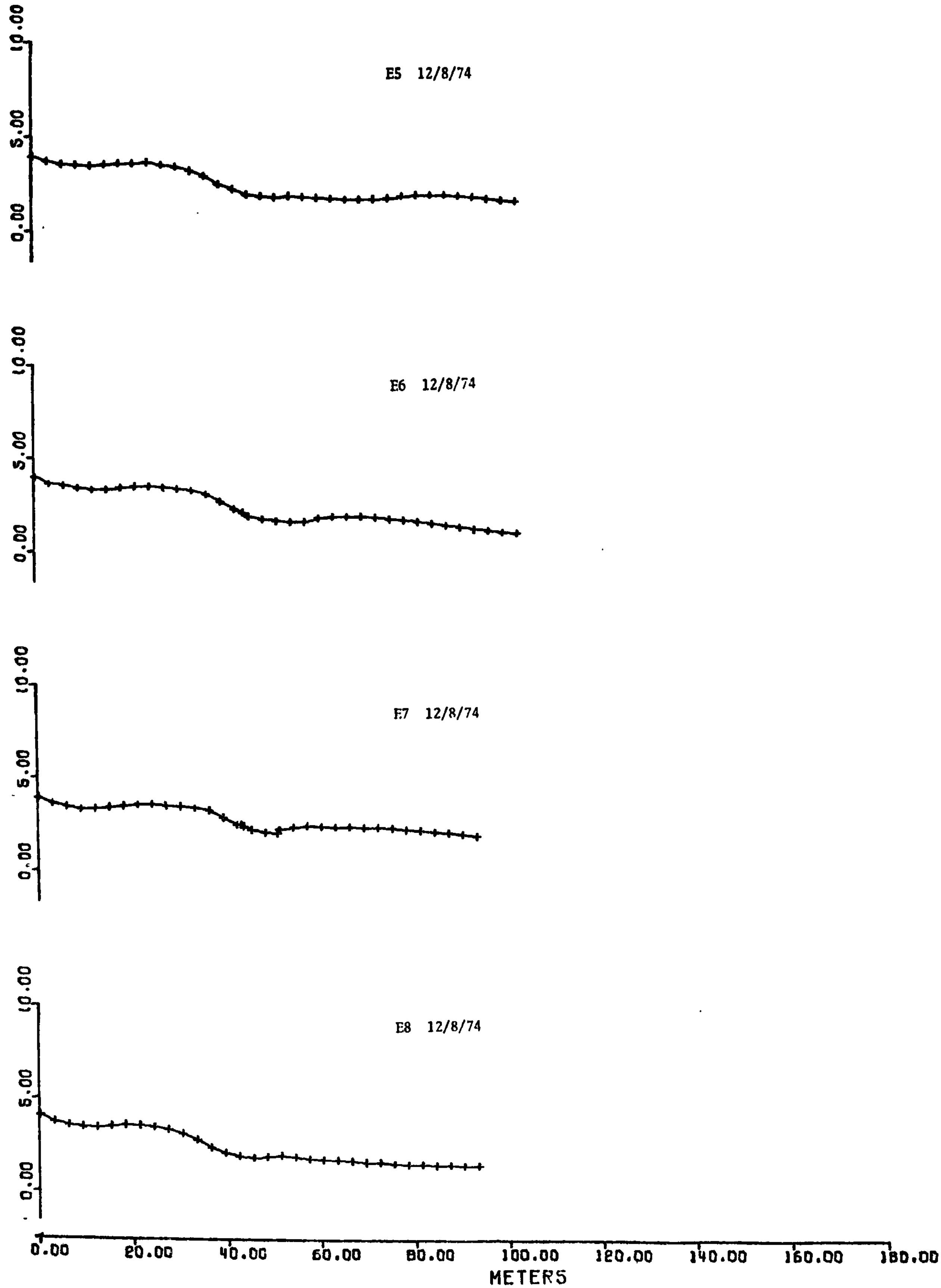

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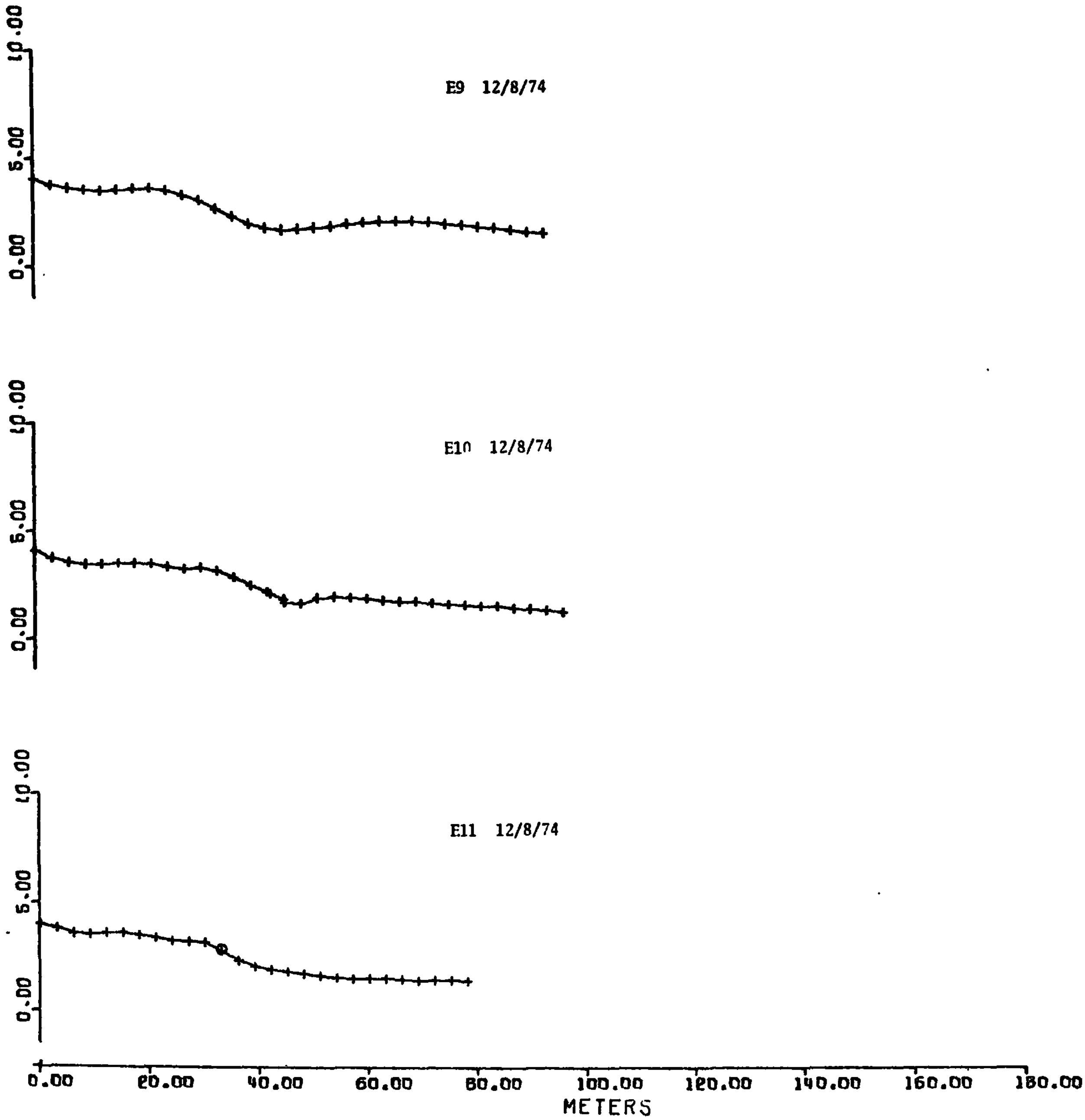
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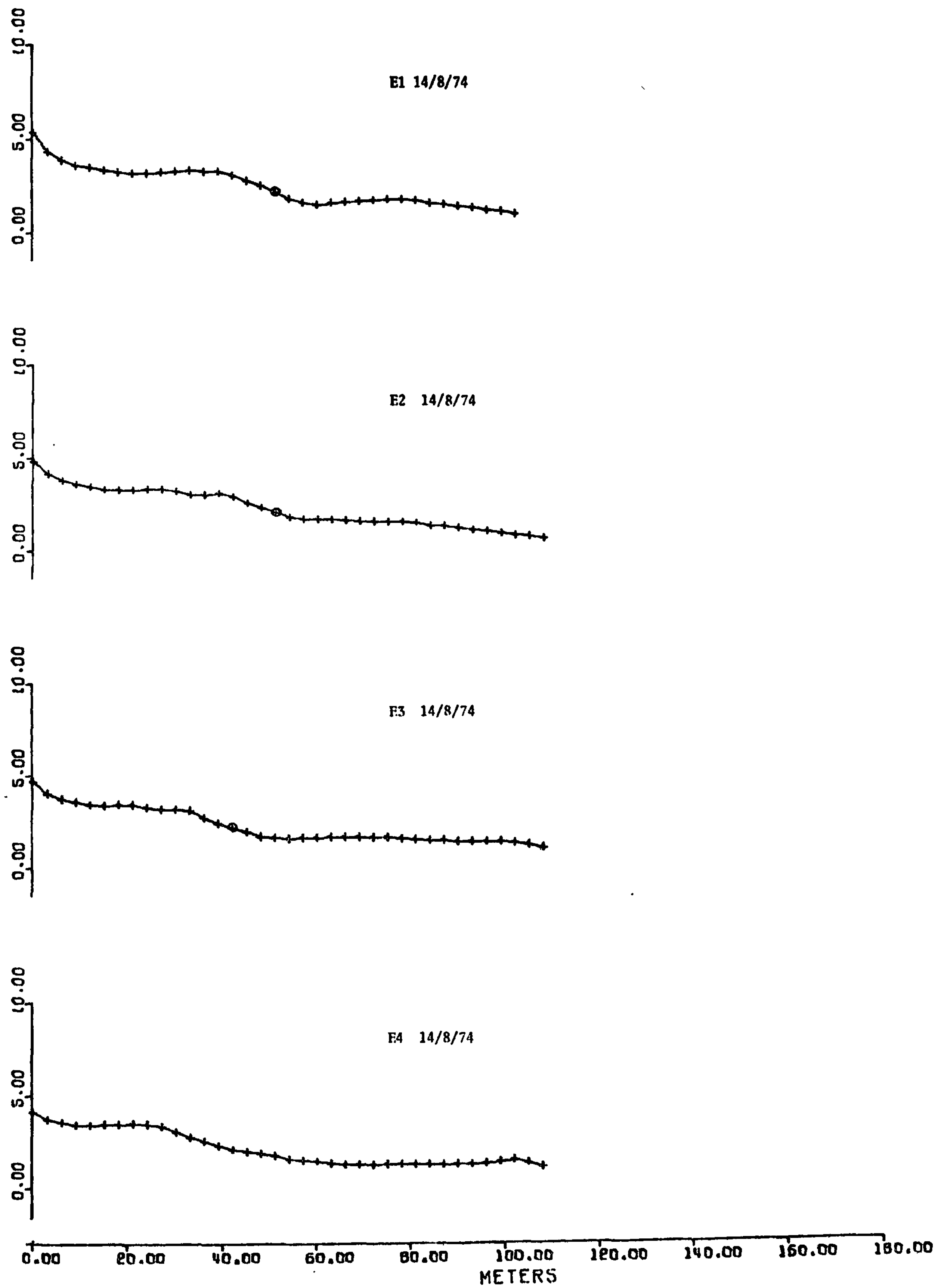
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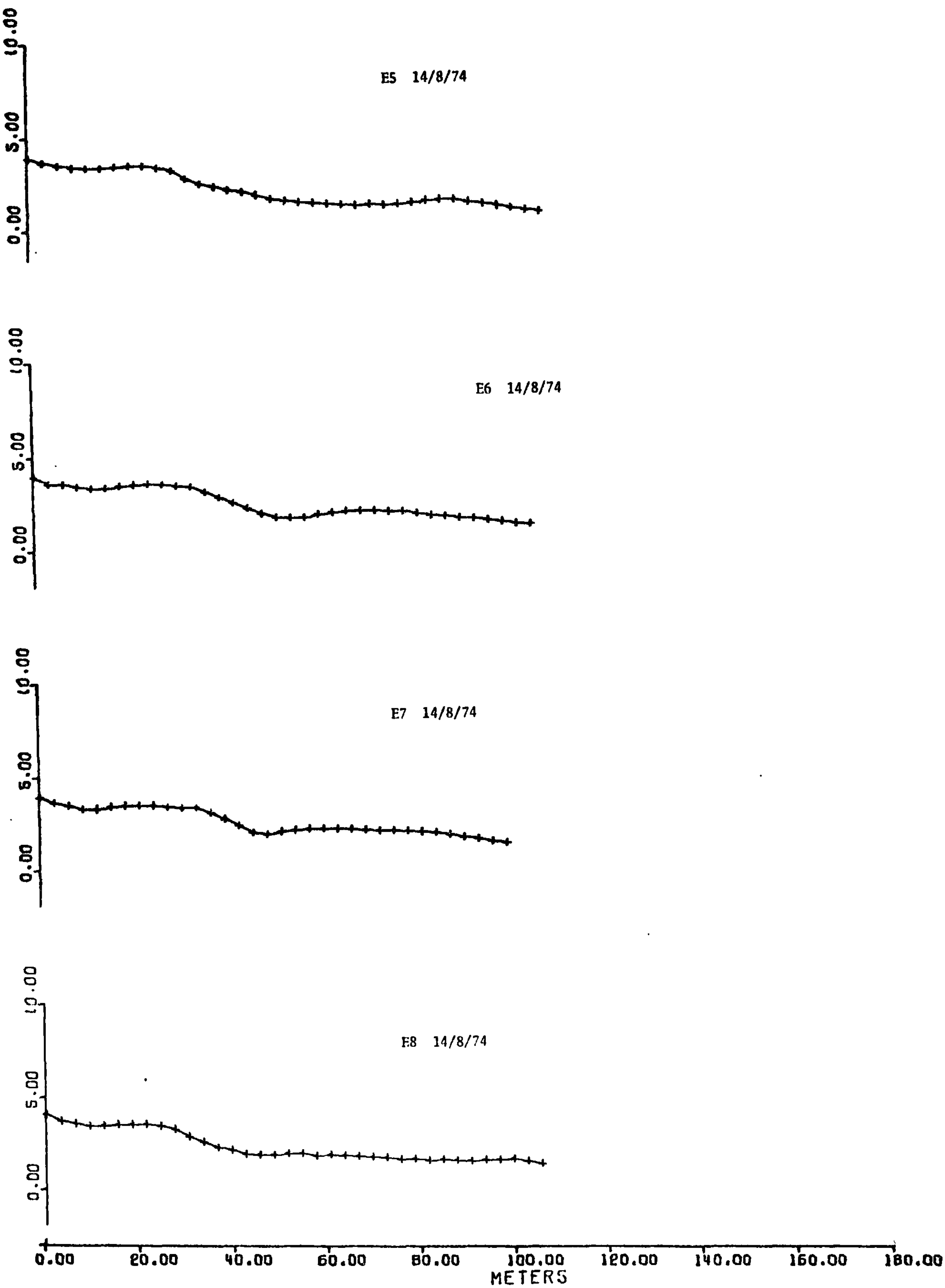
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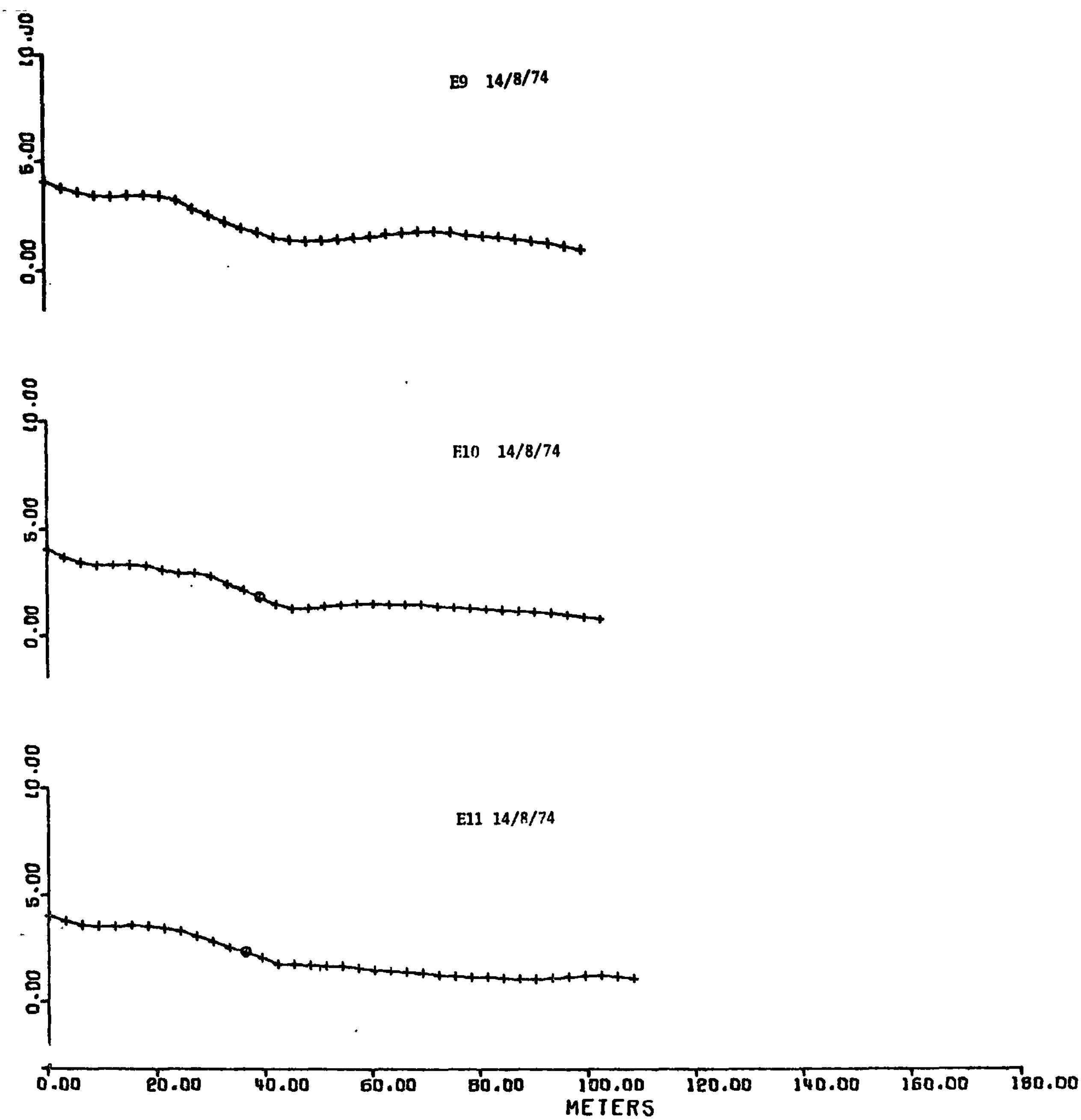
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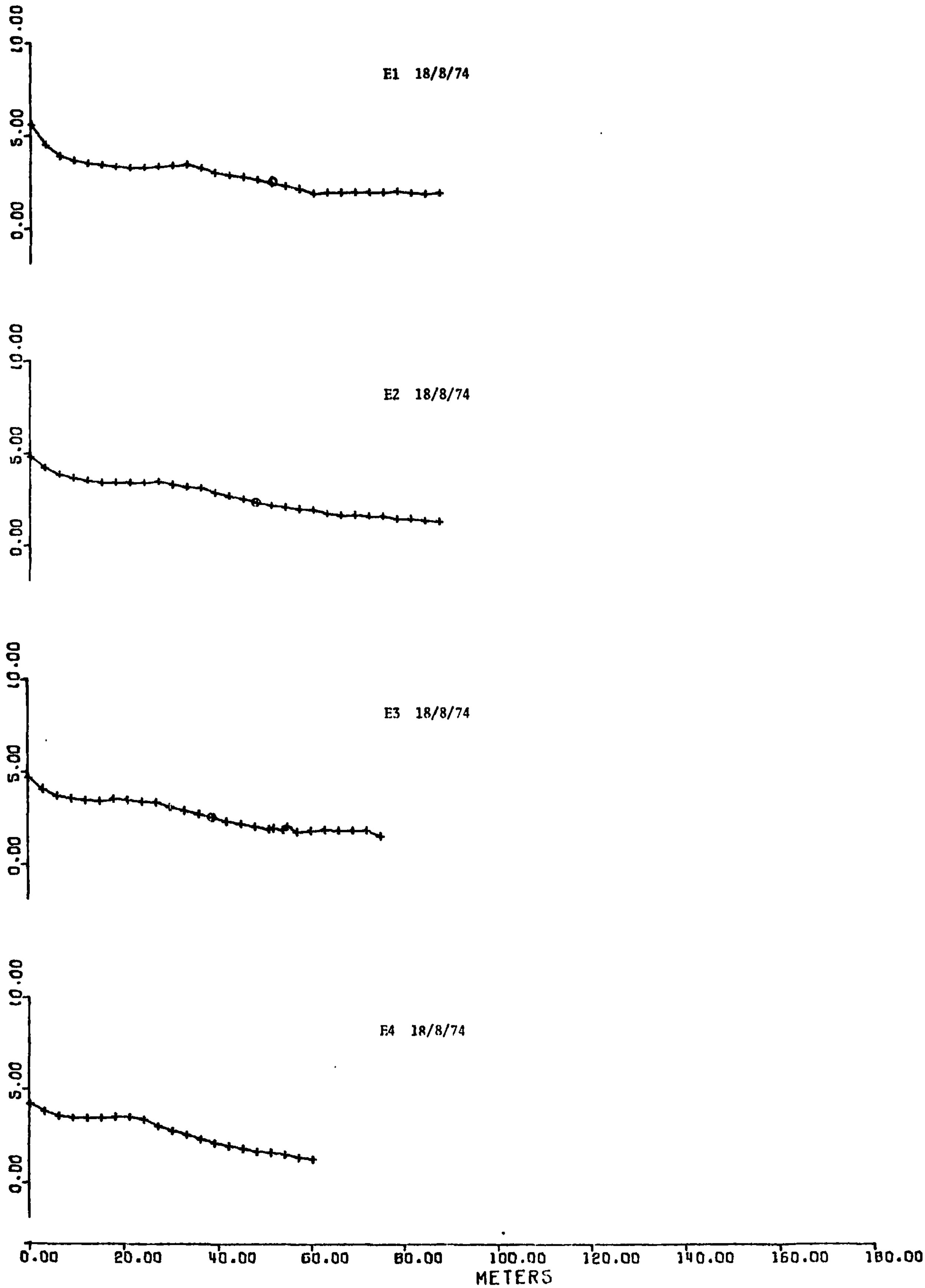

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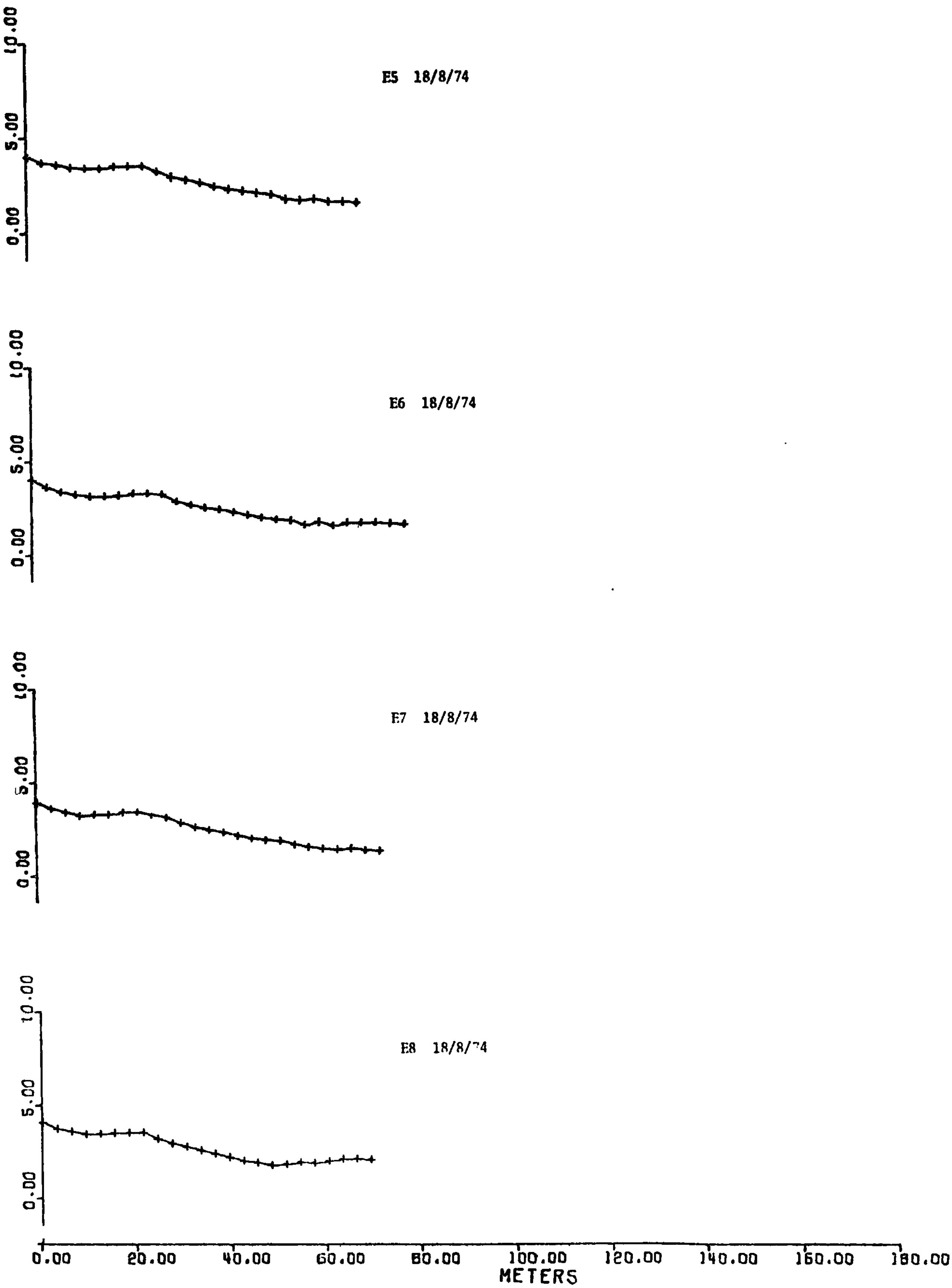
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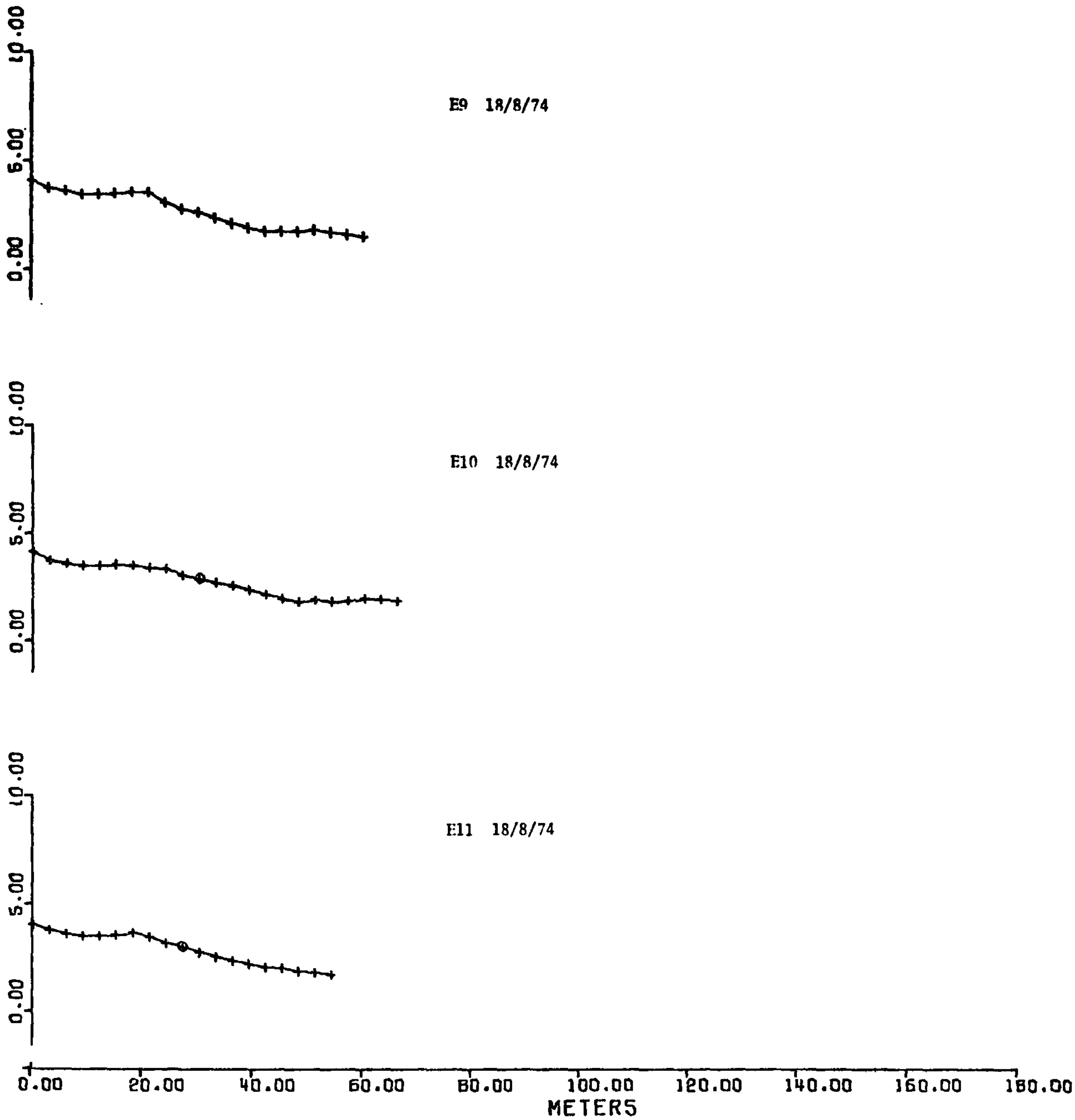
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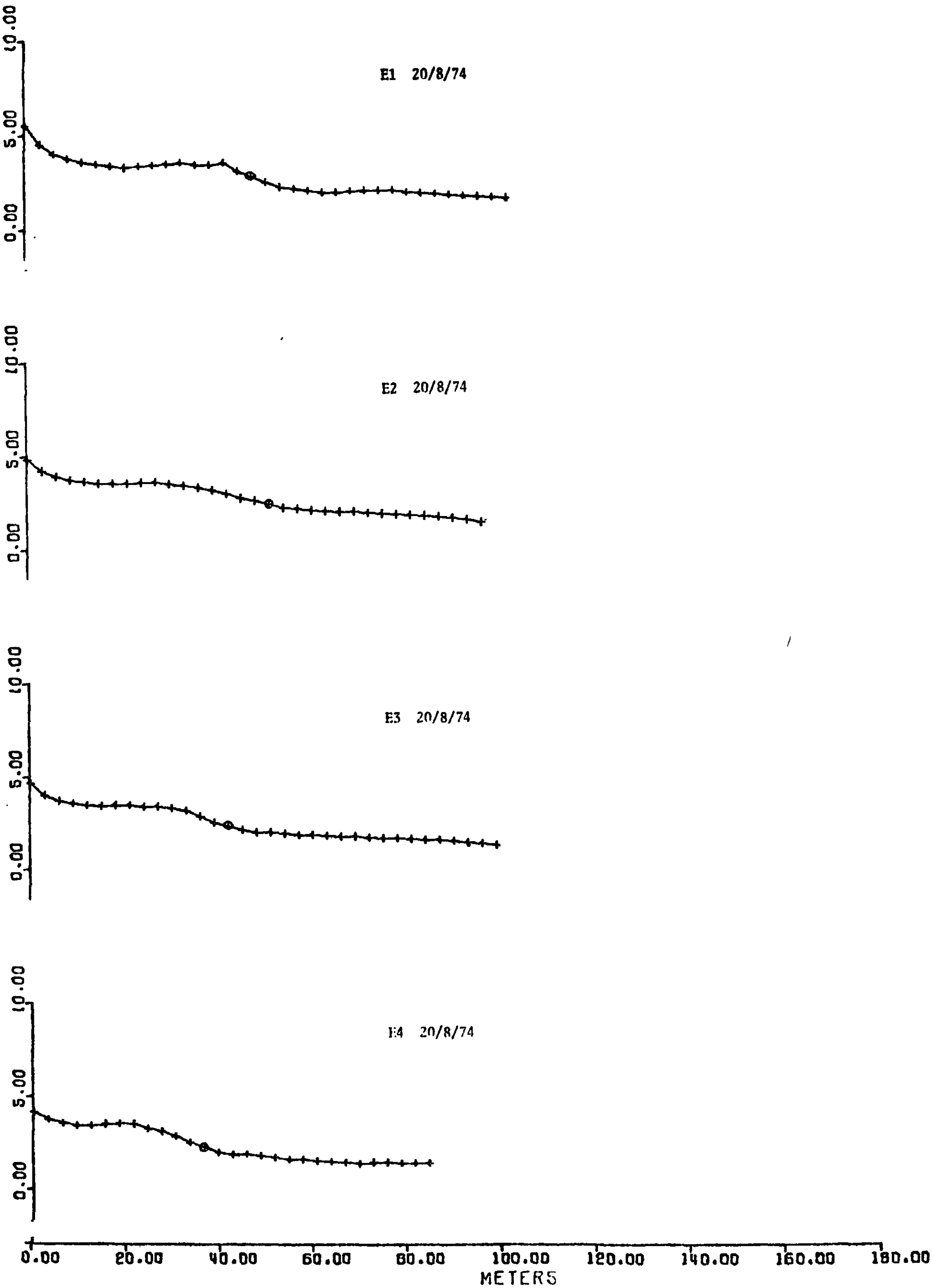
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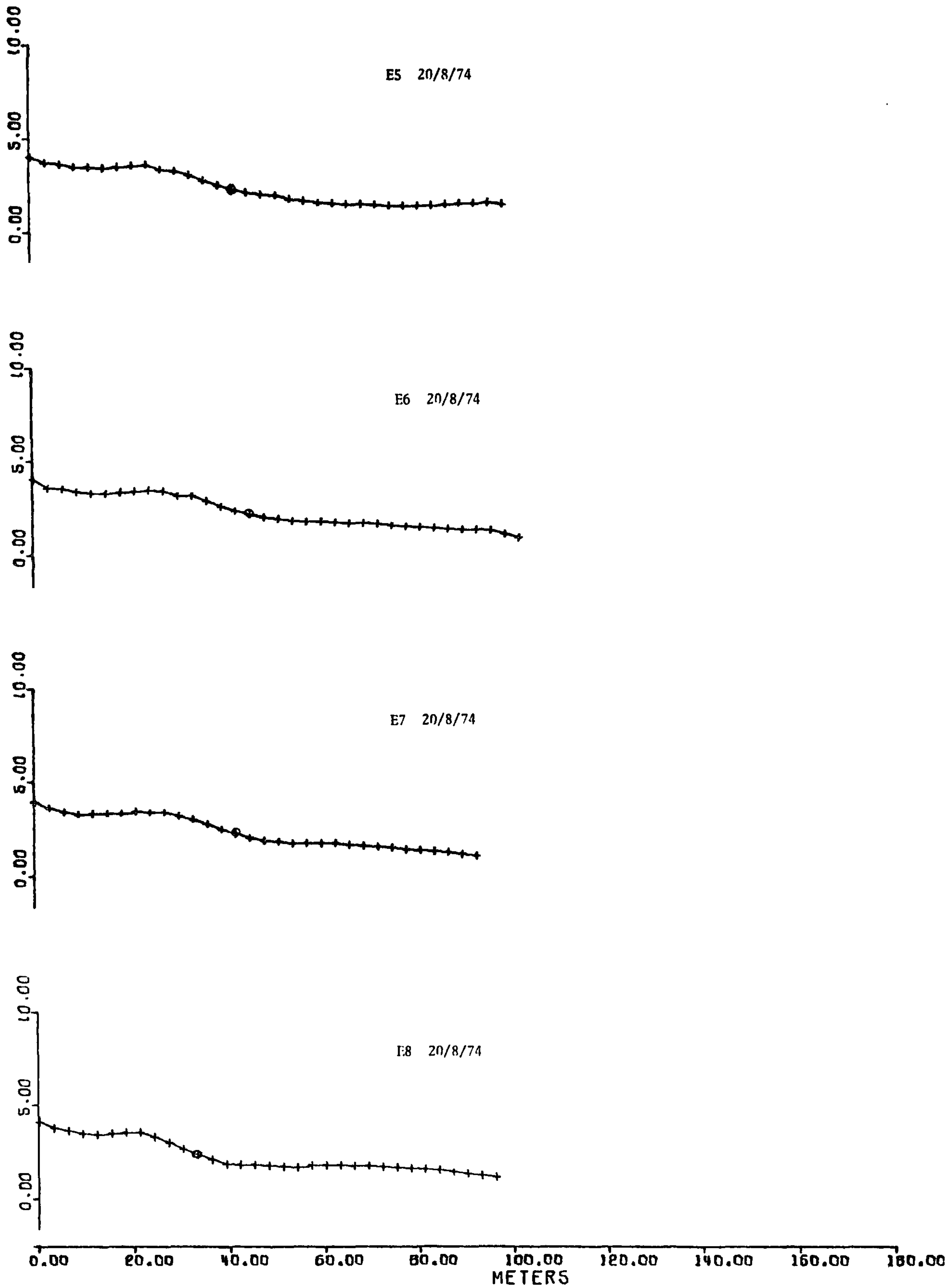
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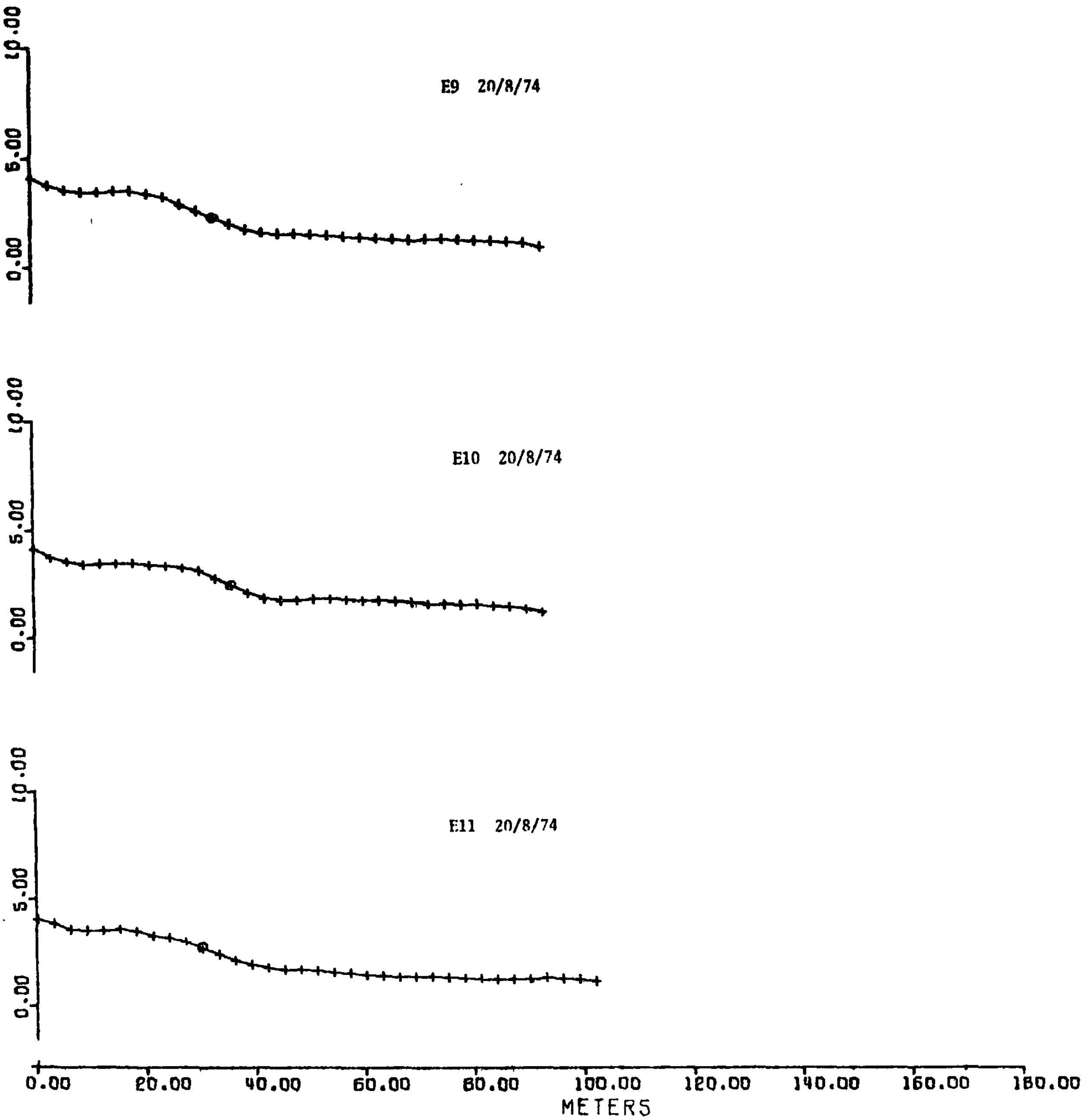
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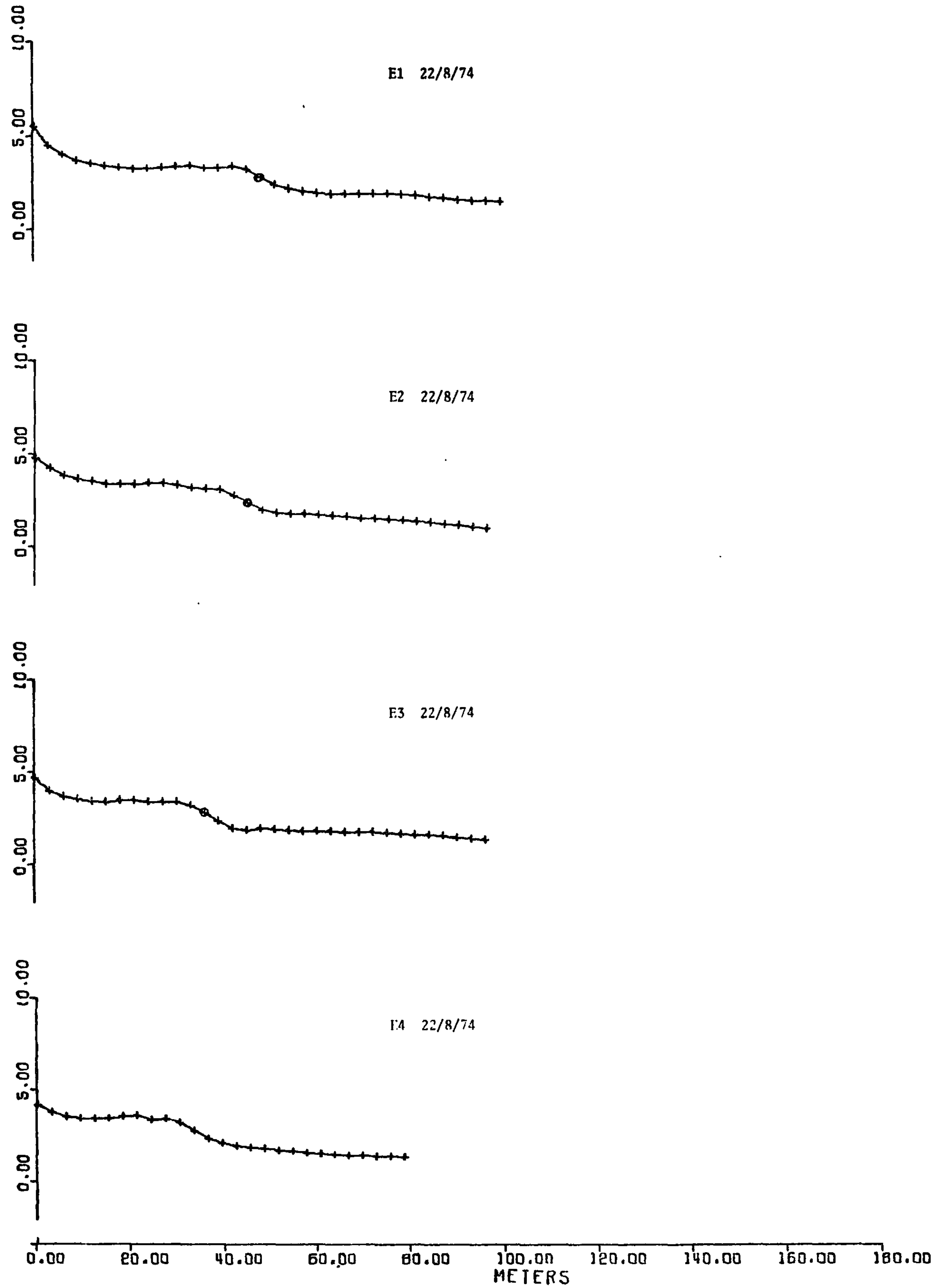

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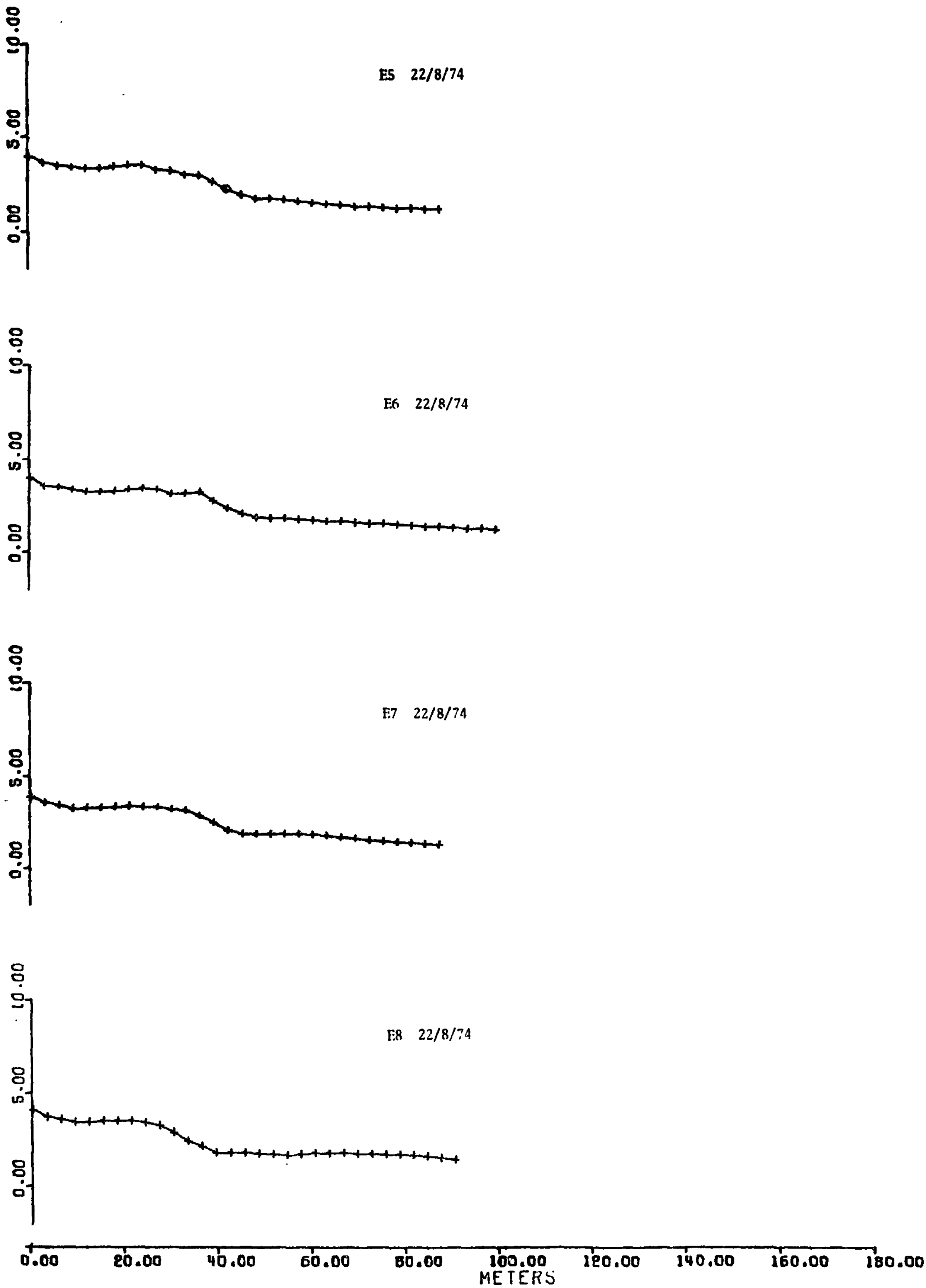
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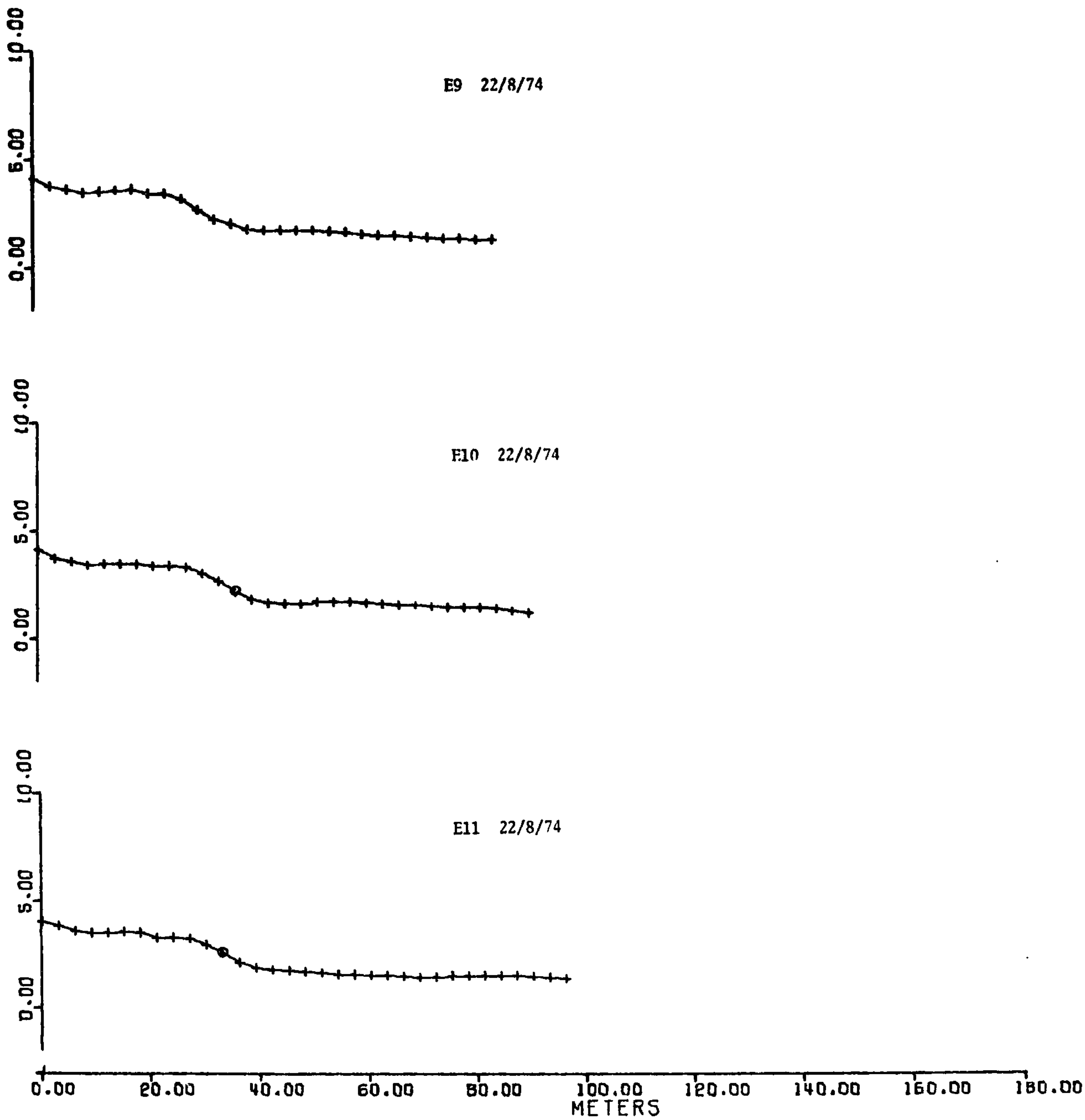
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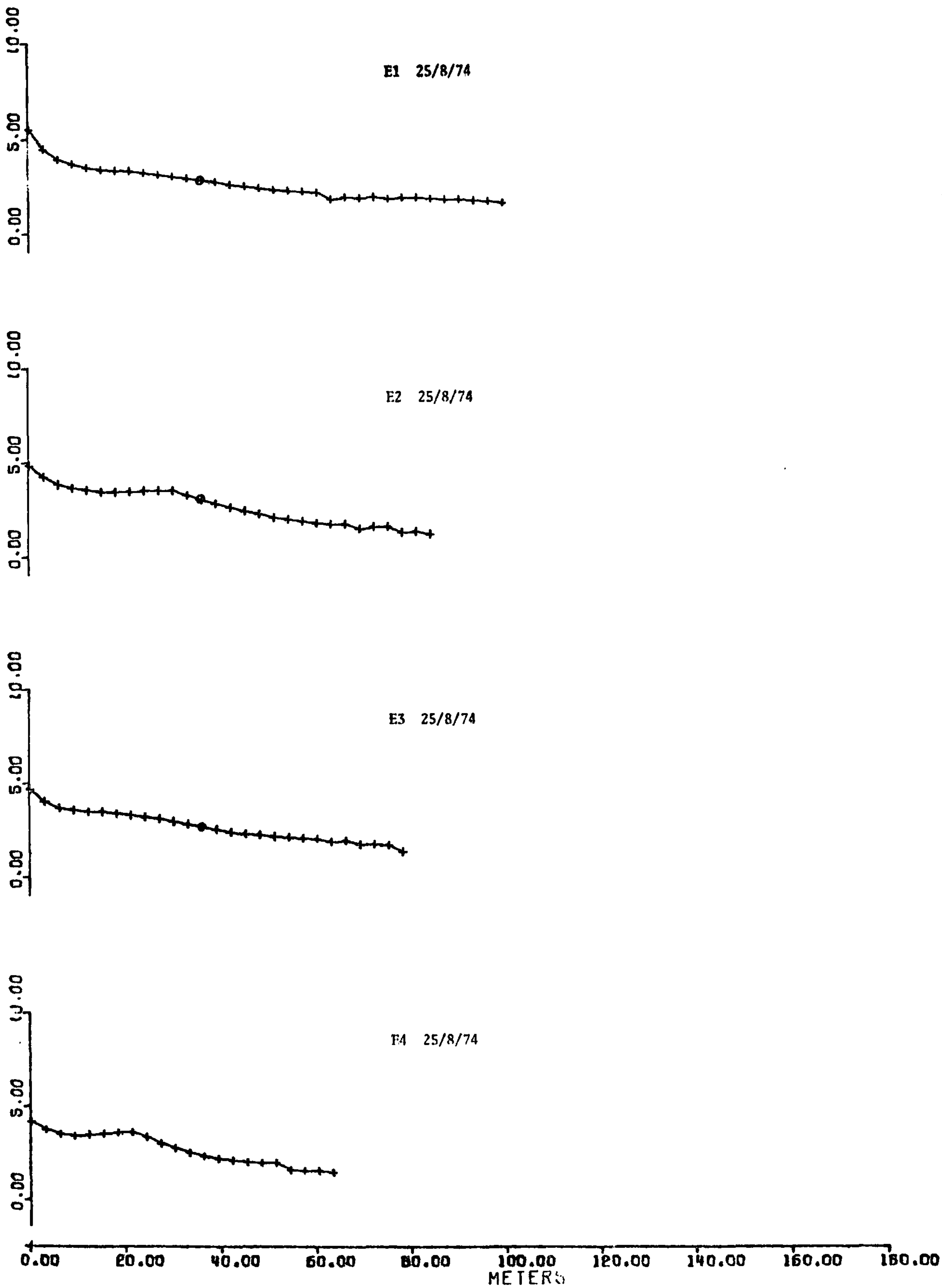
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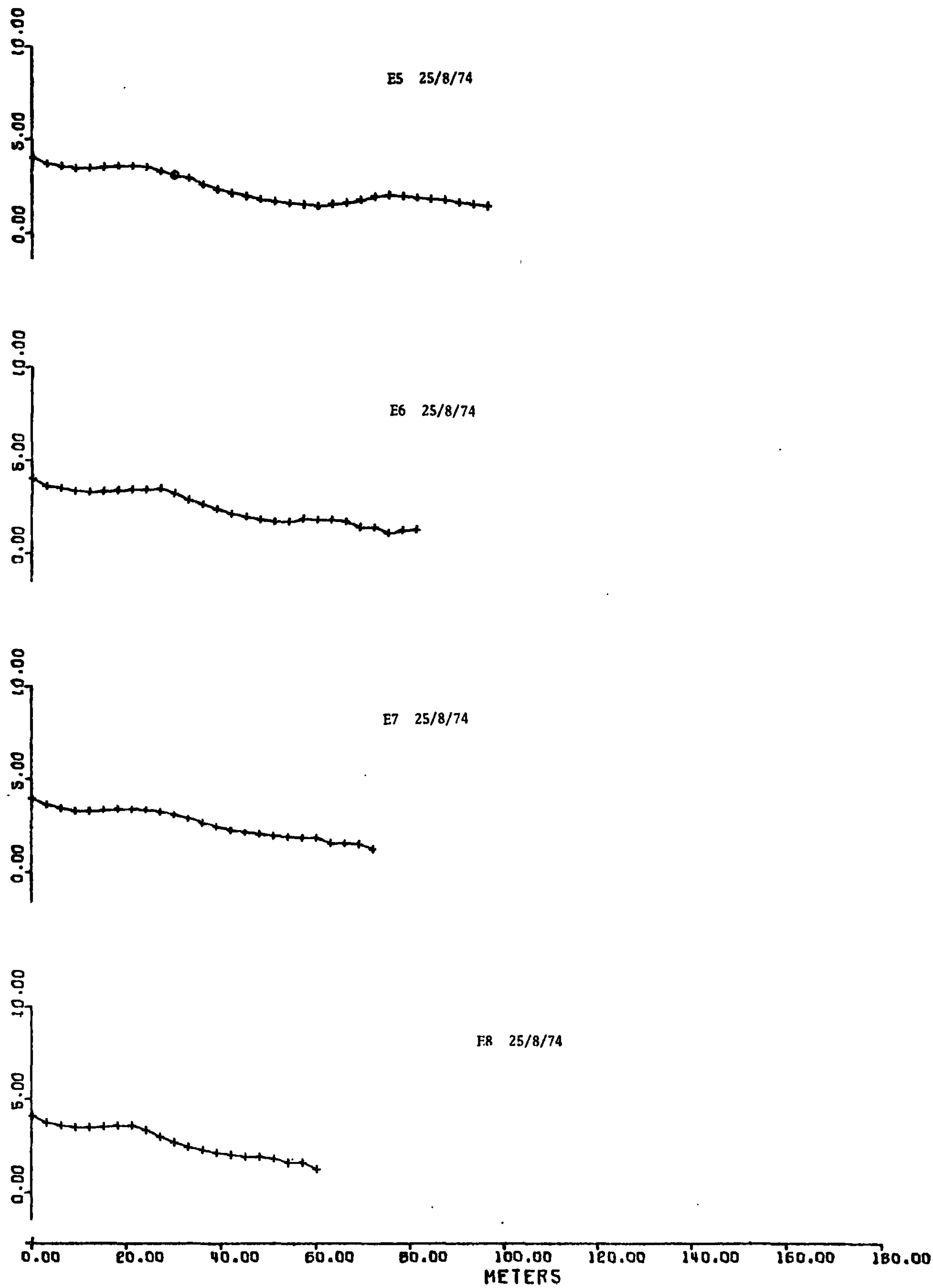
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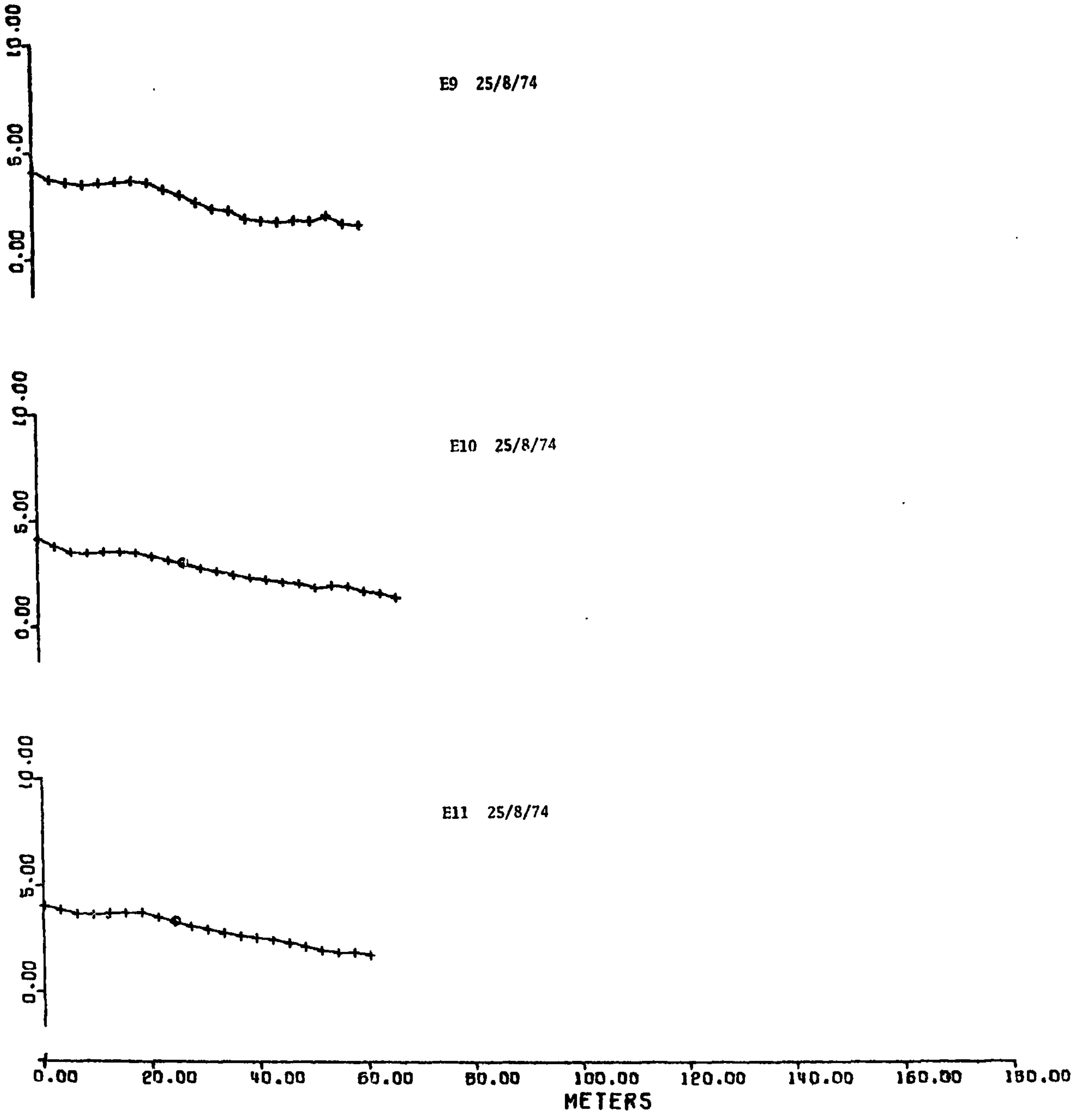
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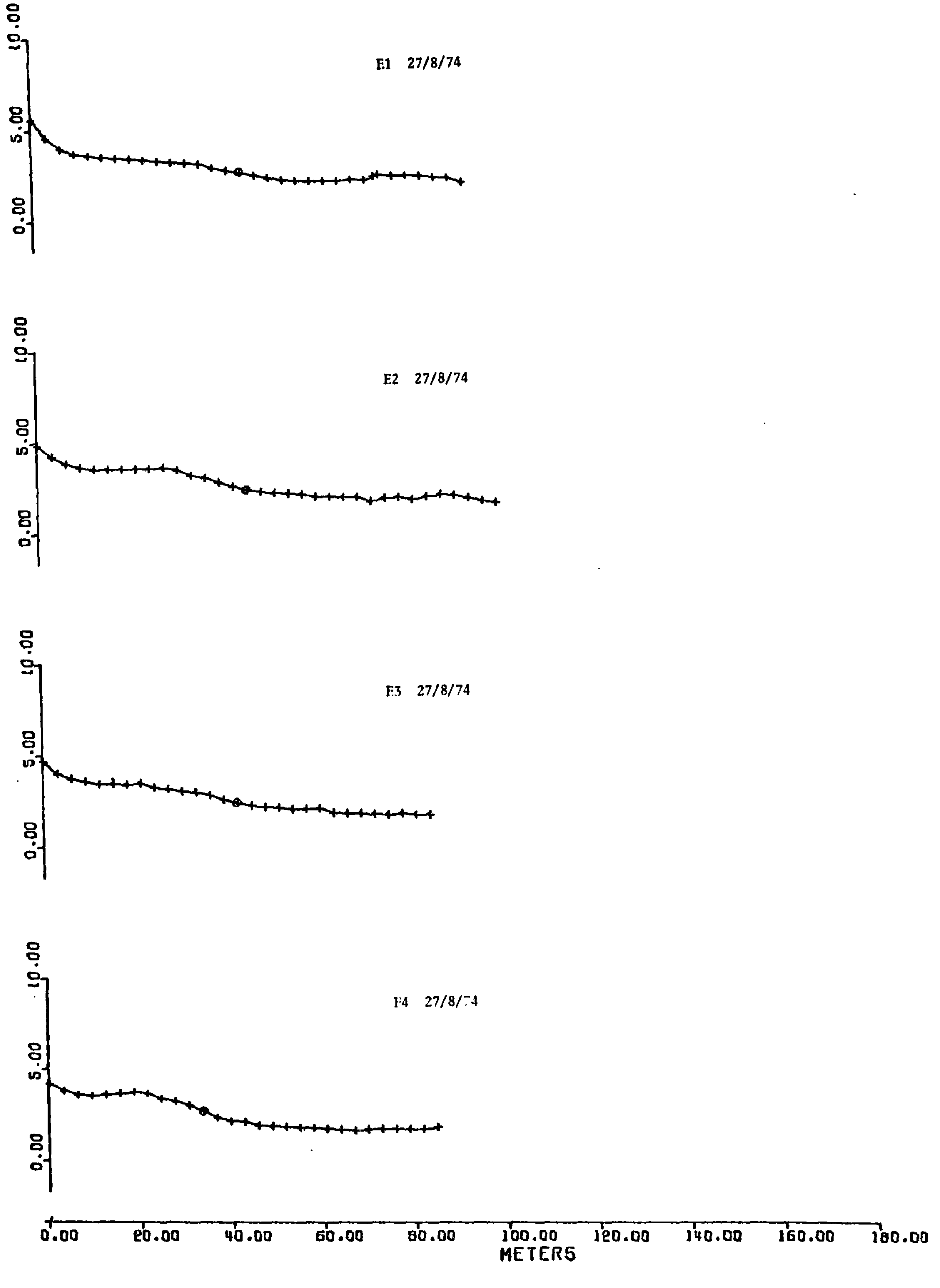
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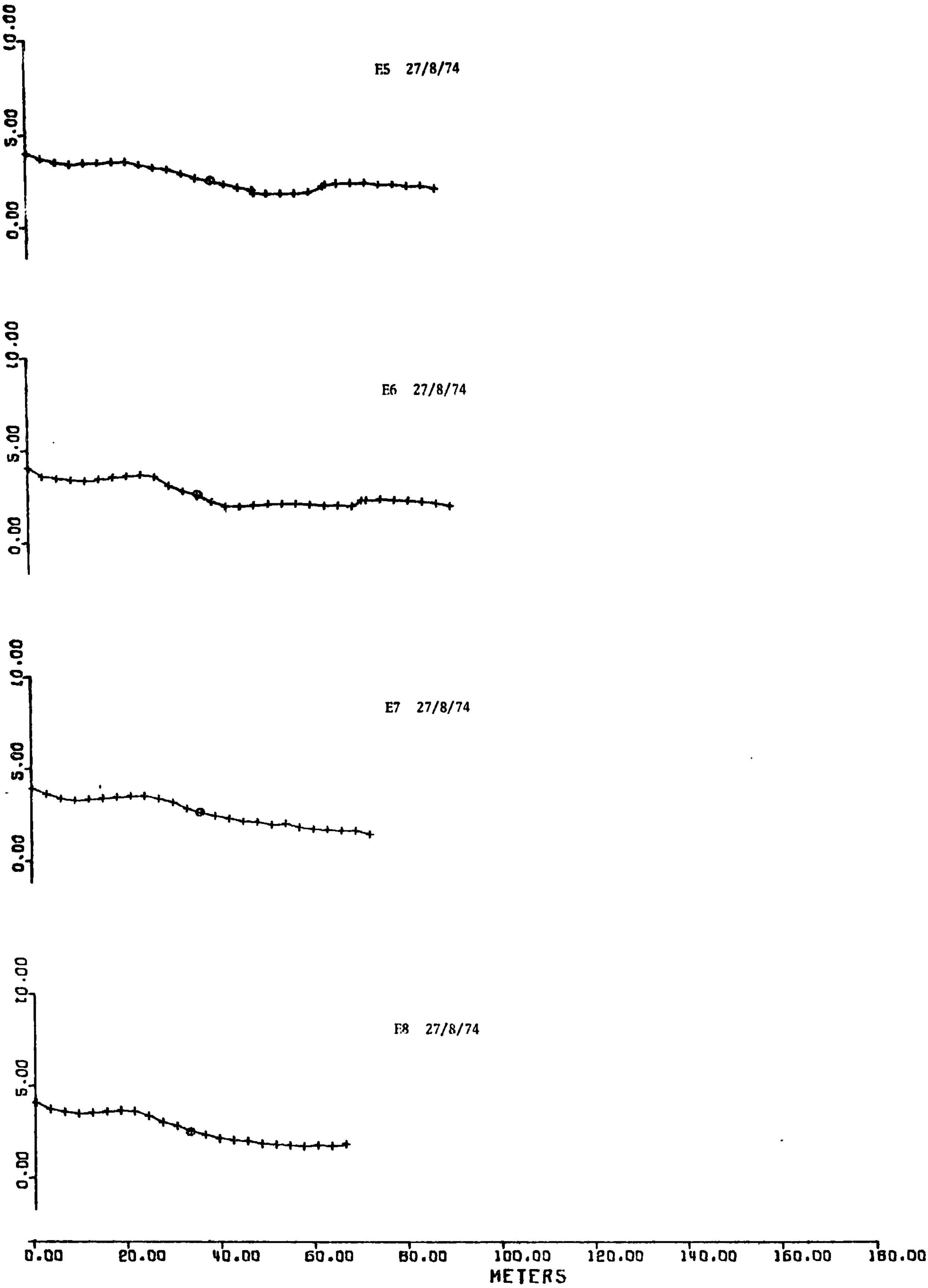
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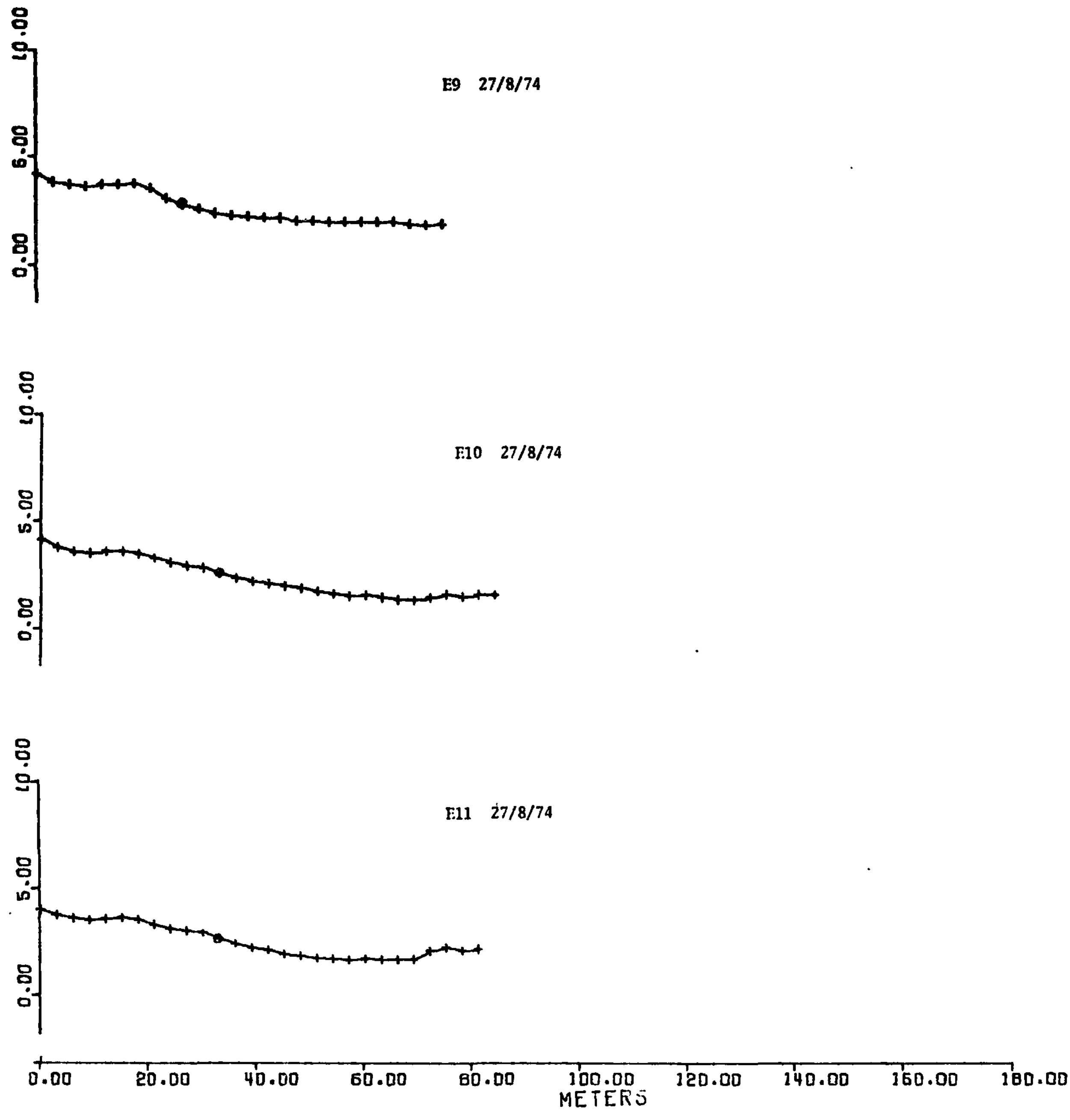
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PROFILE PLOTS

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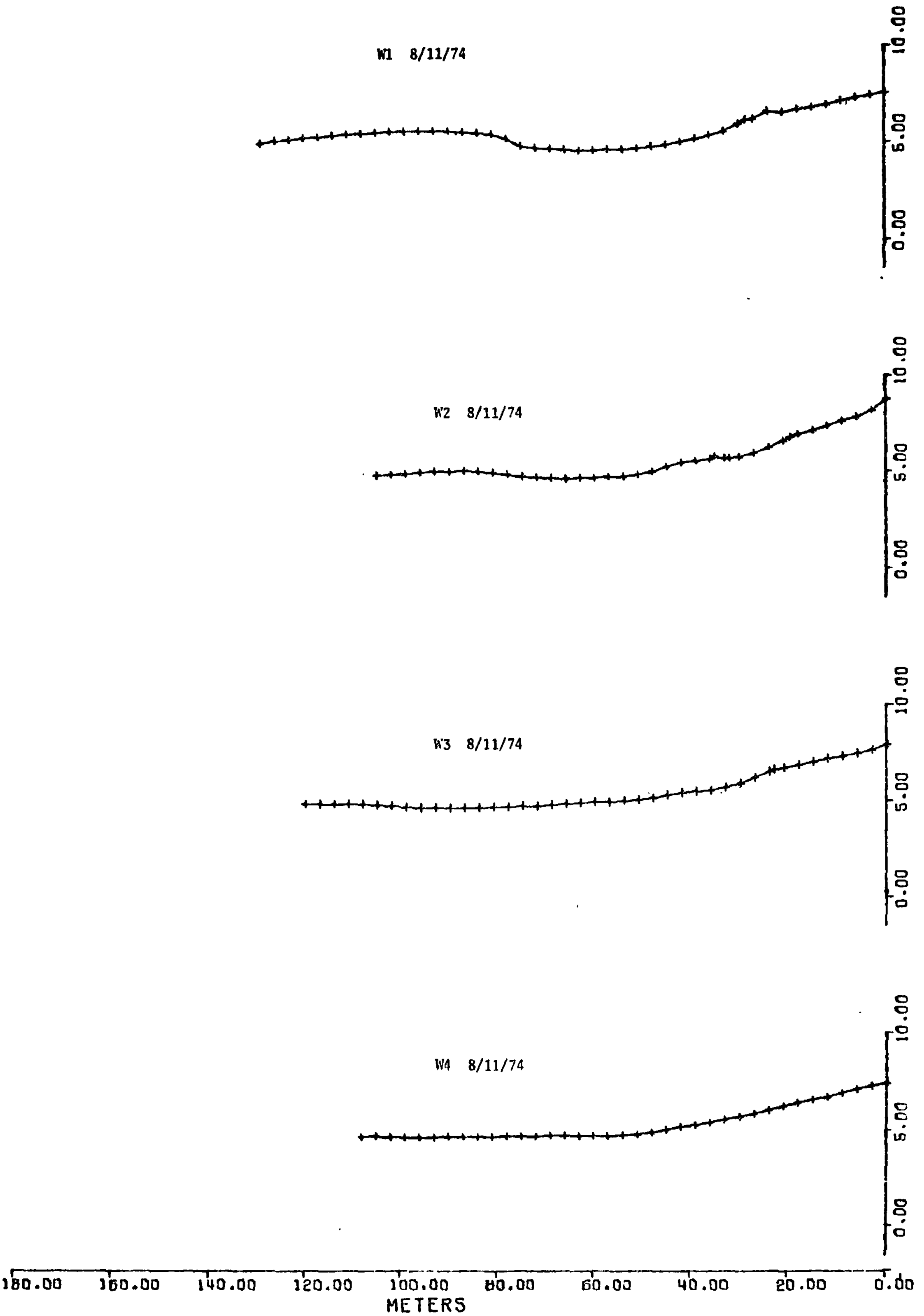
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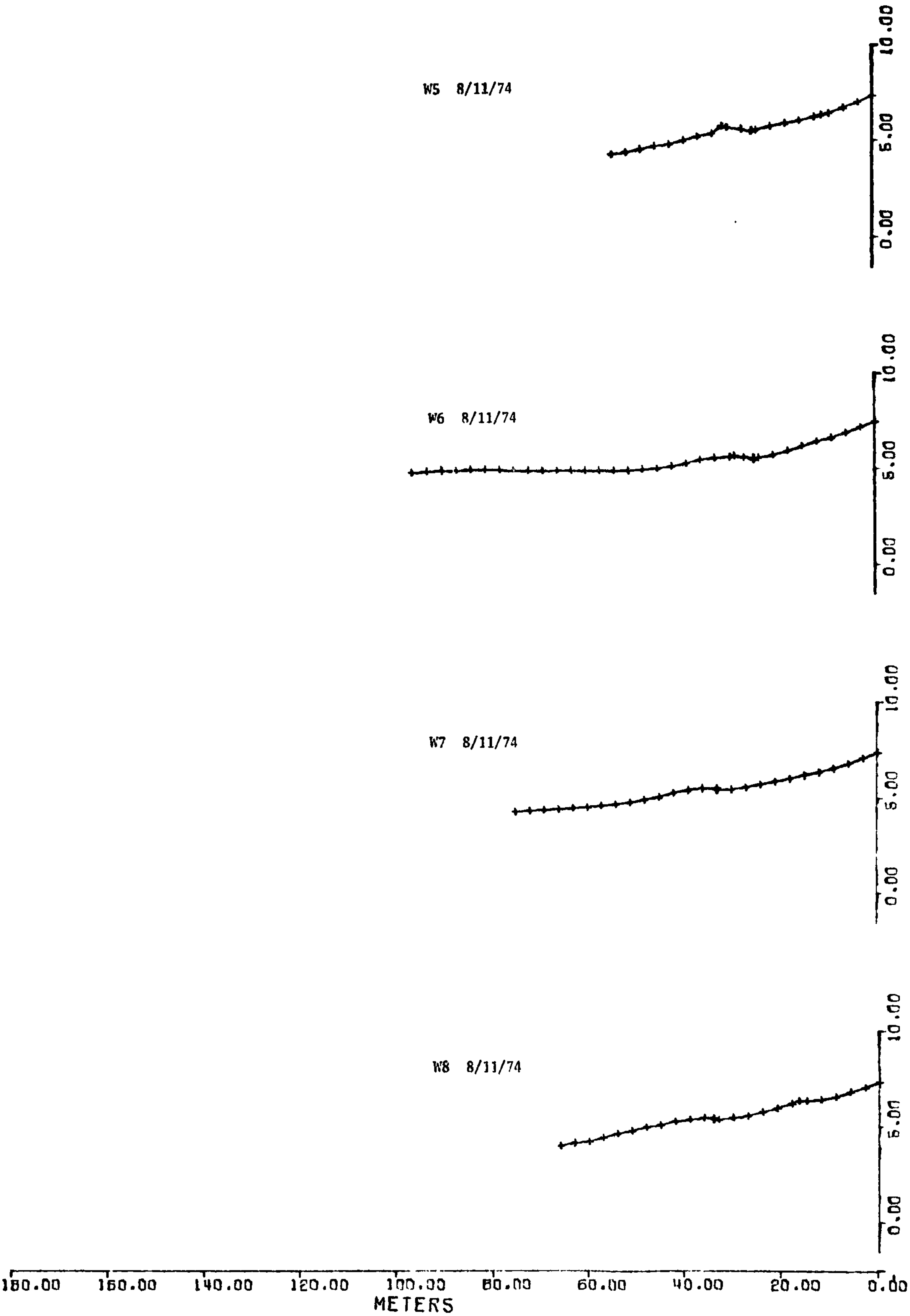
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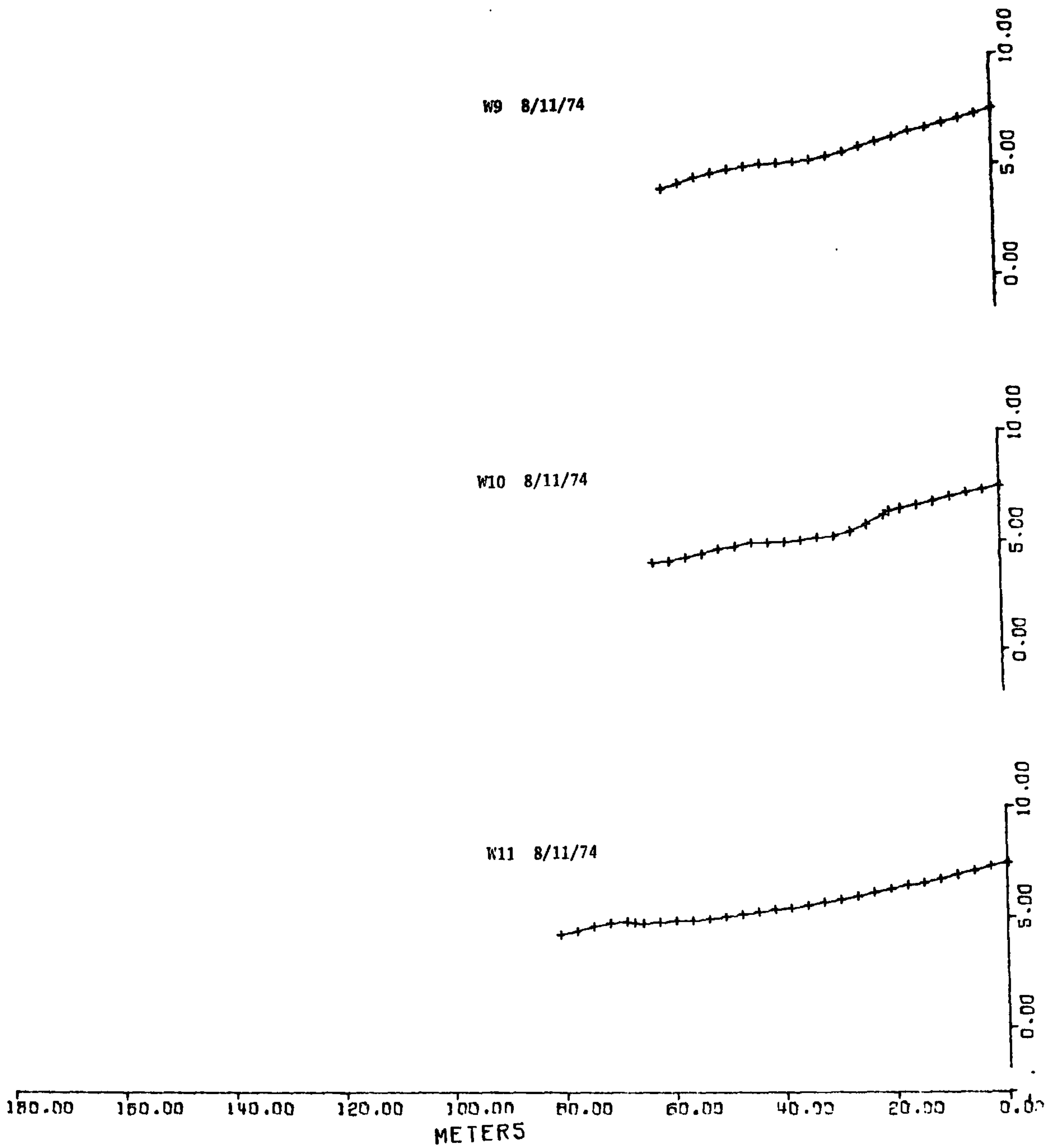
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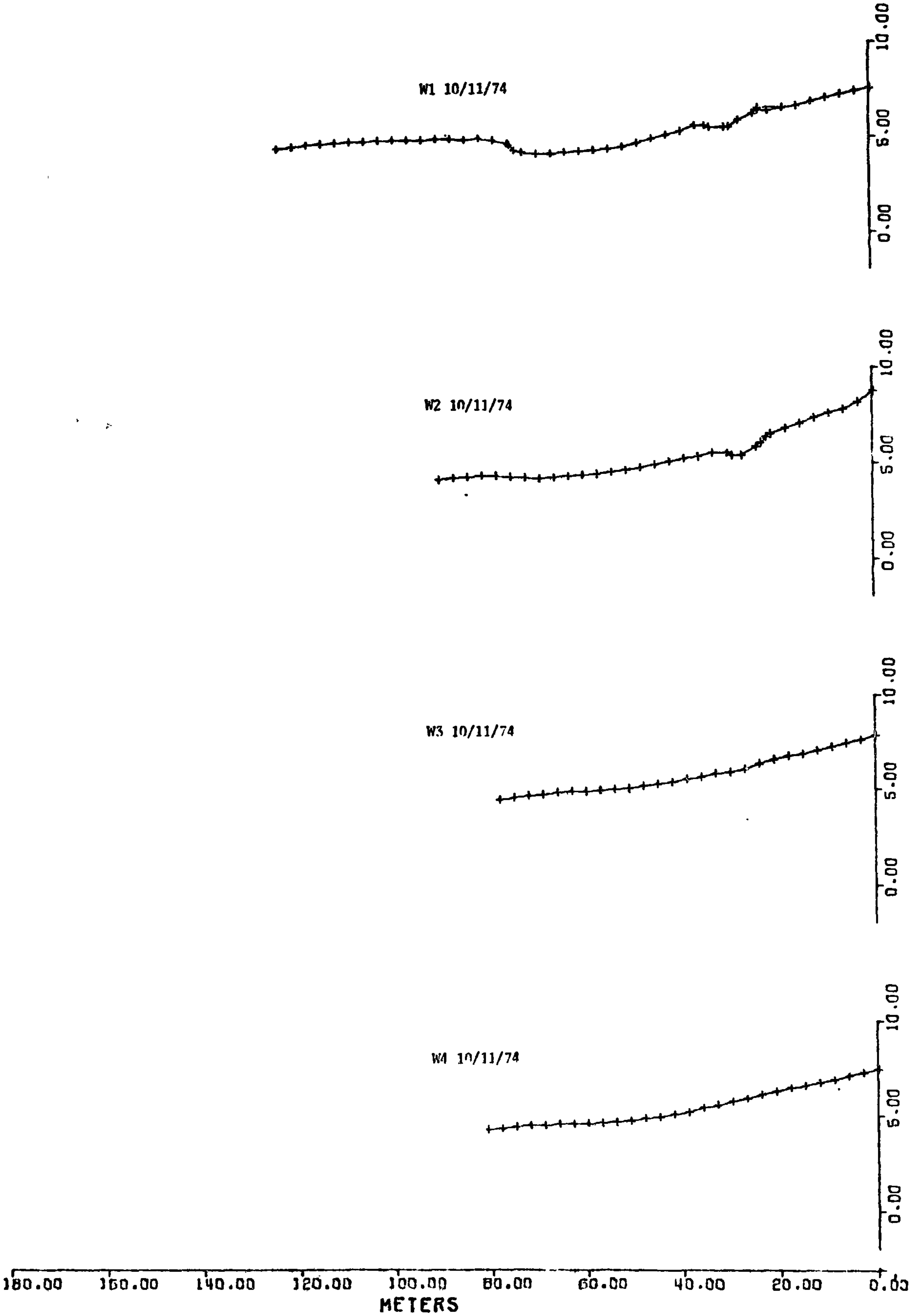
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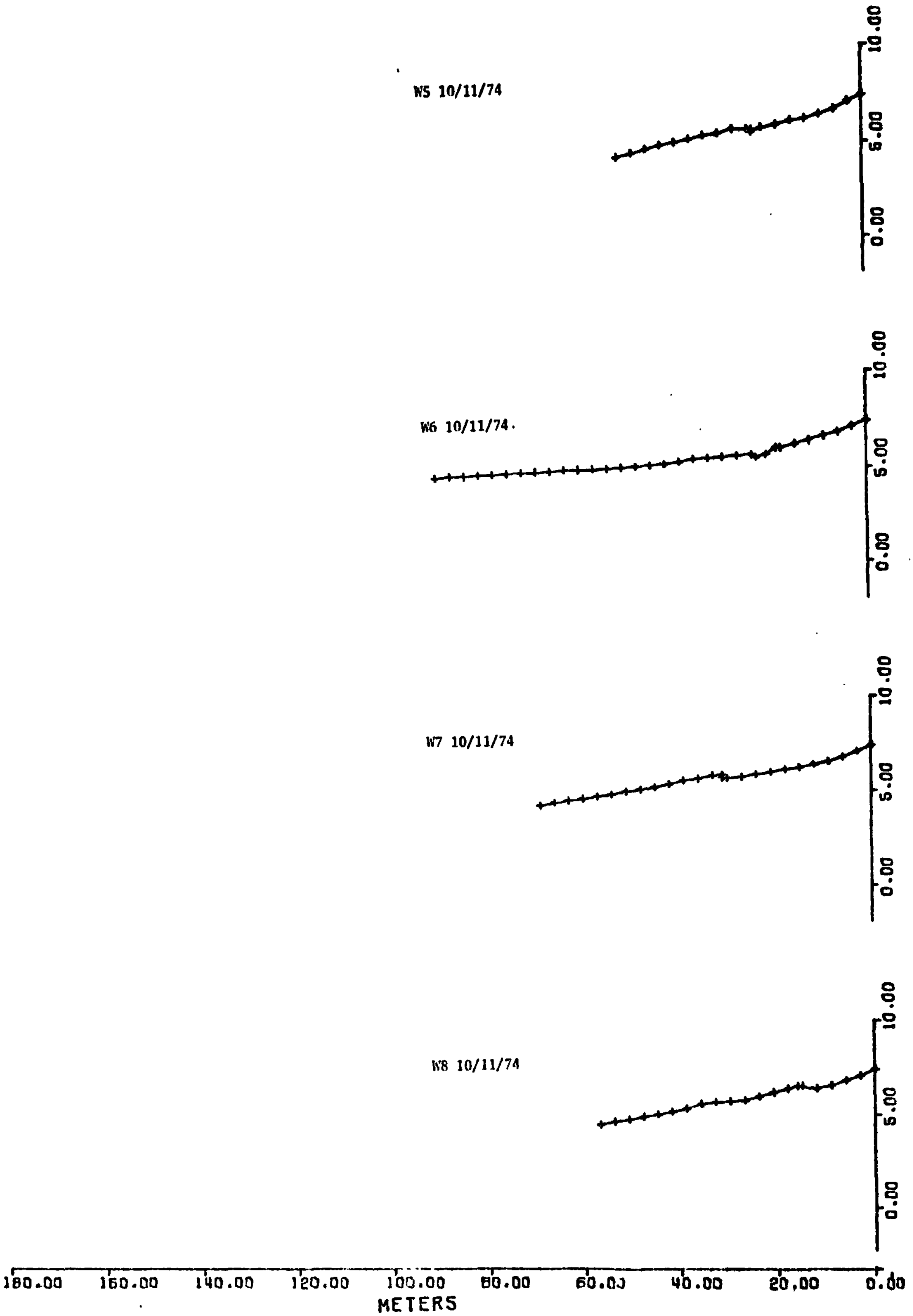
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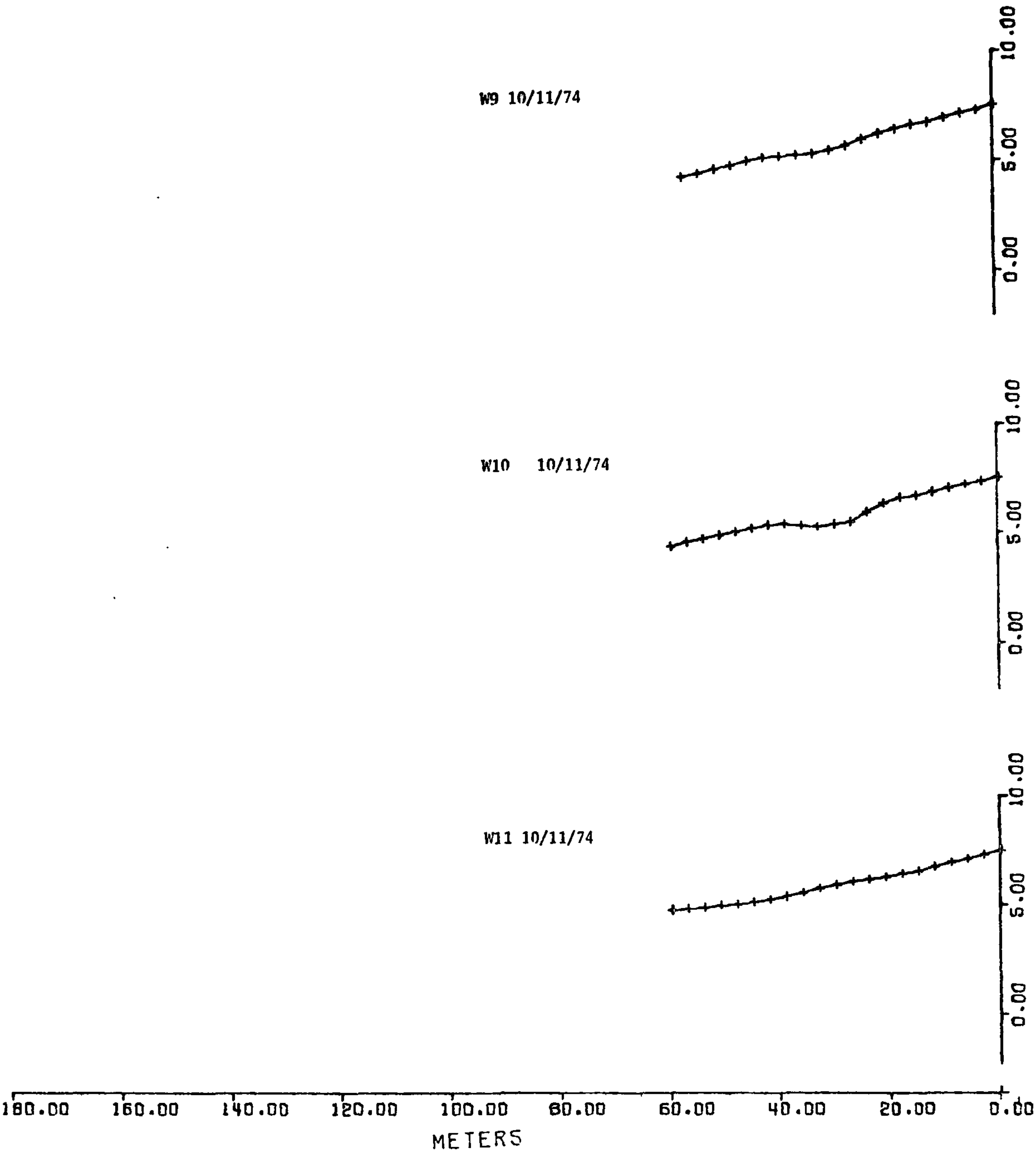
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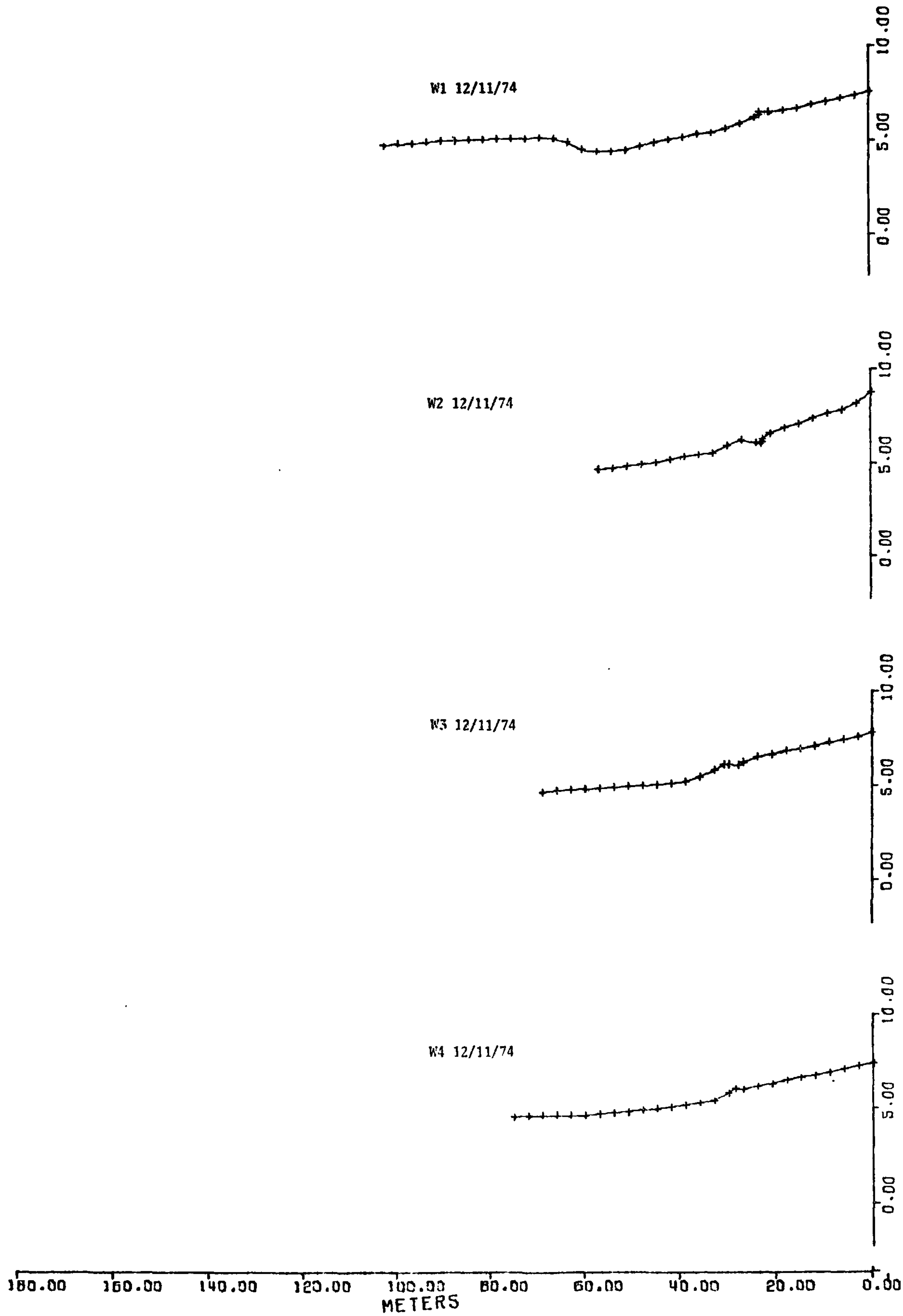
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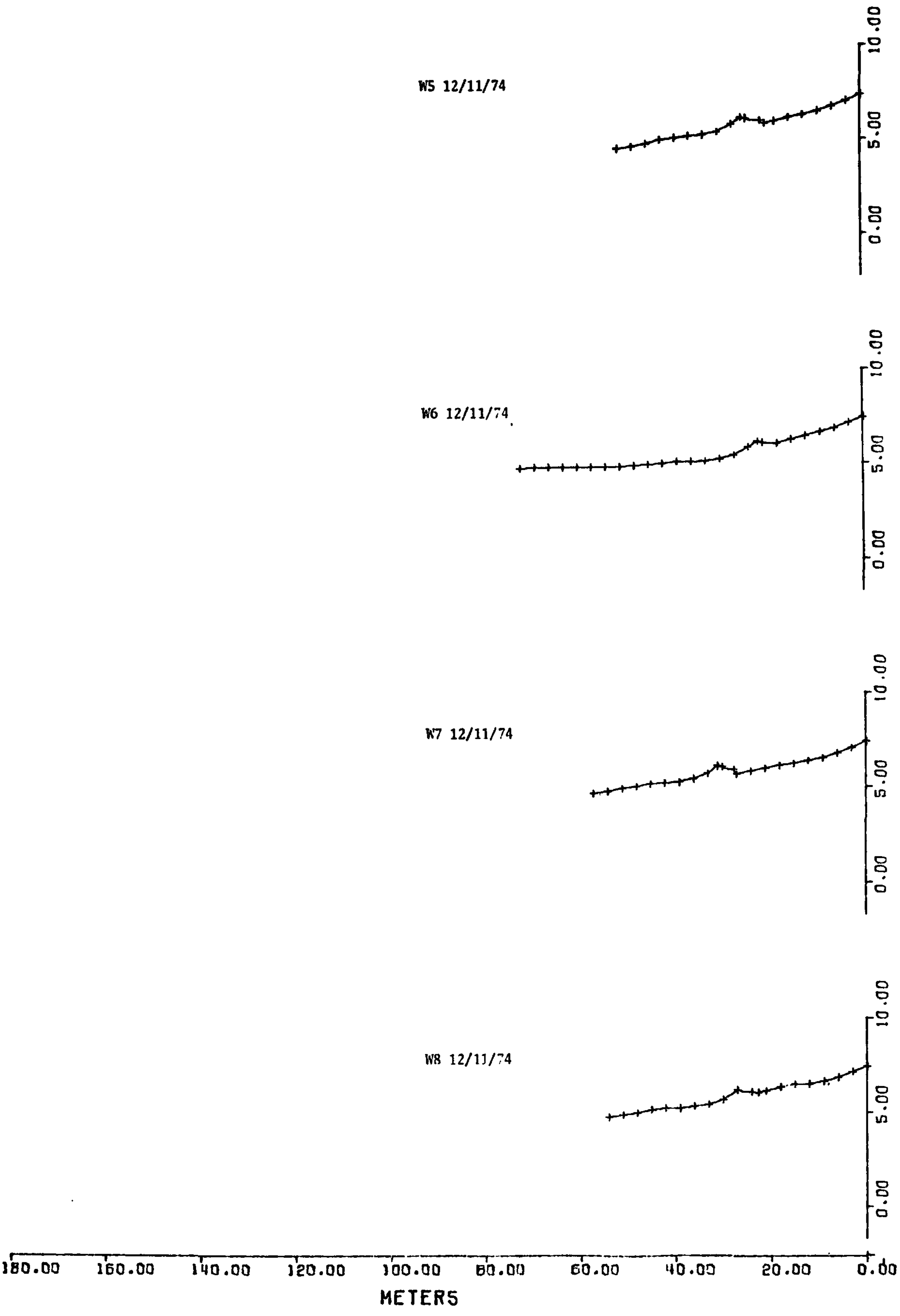
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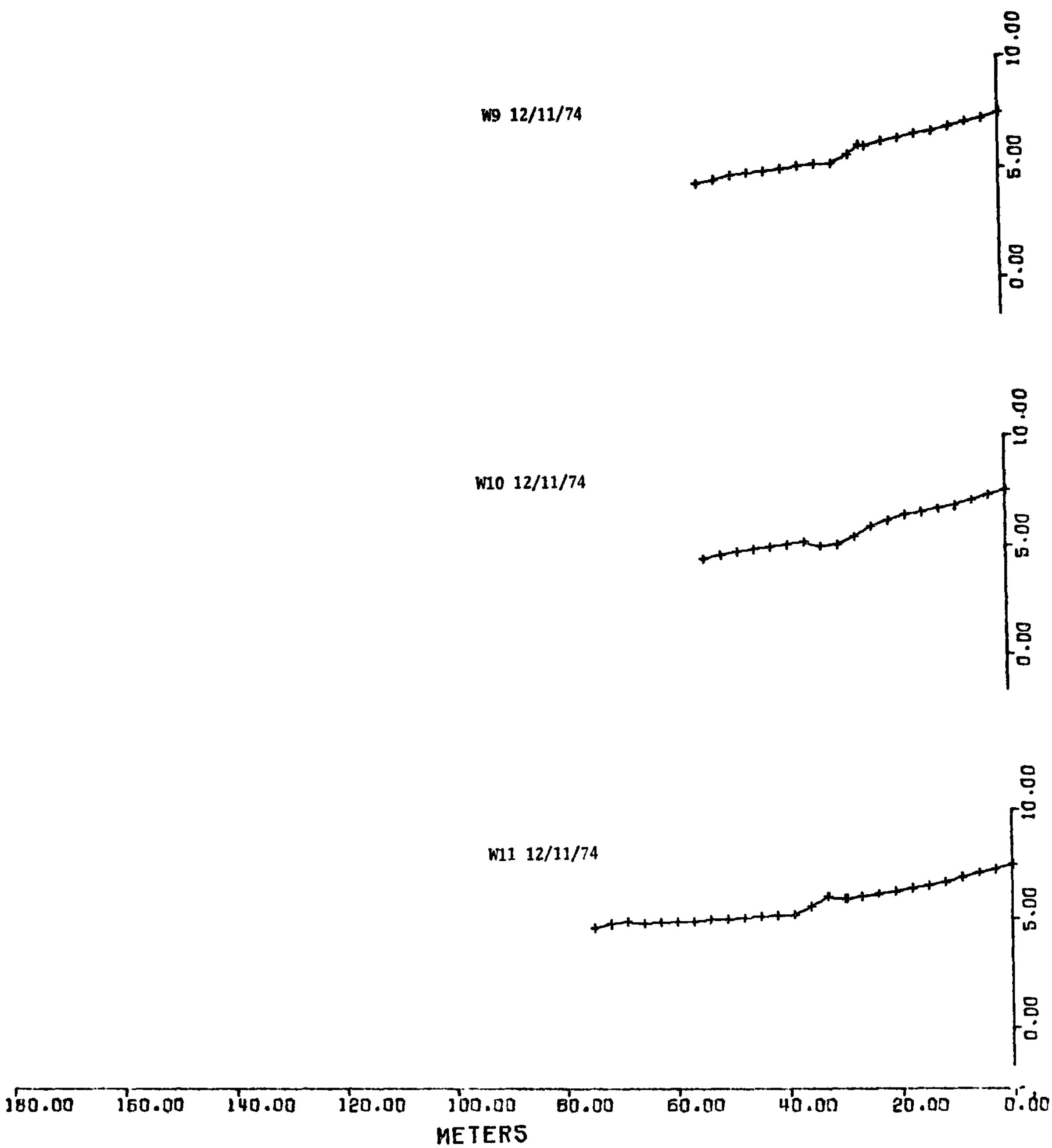
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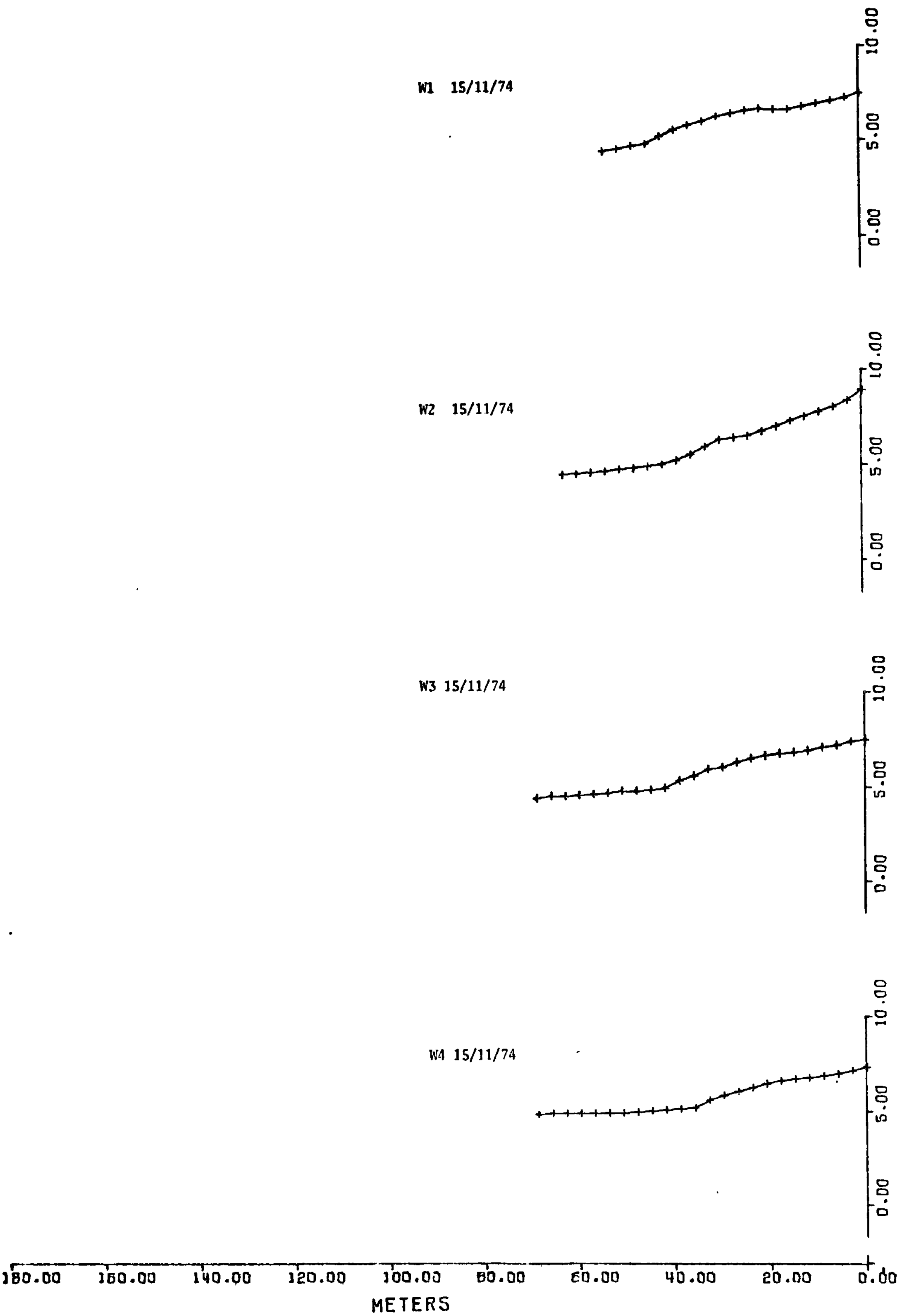
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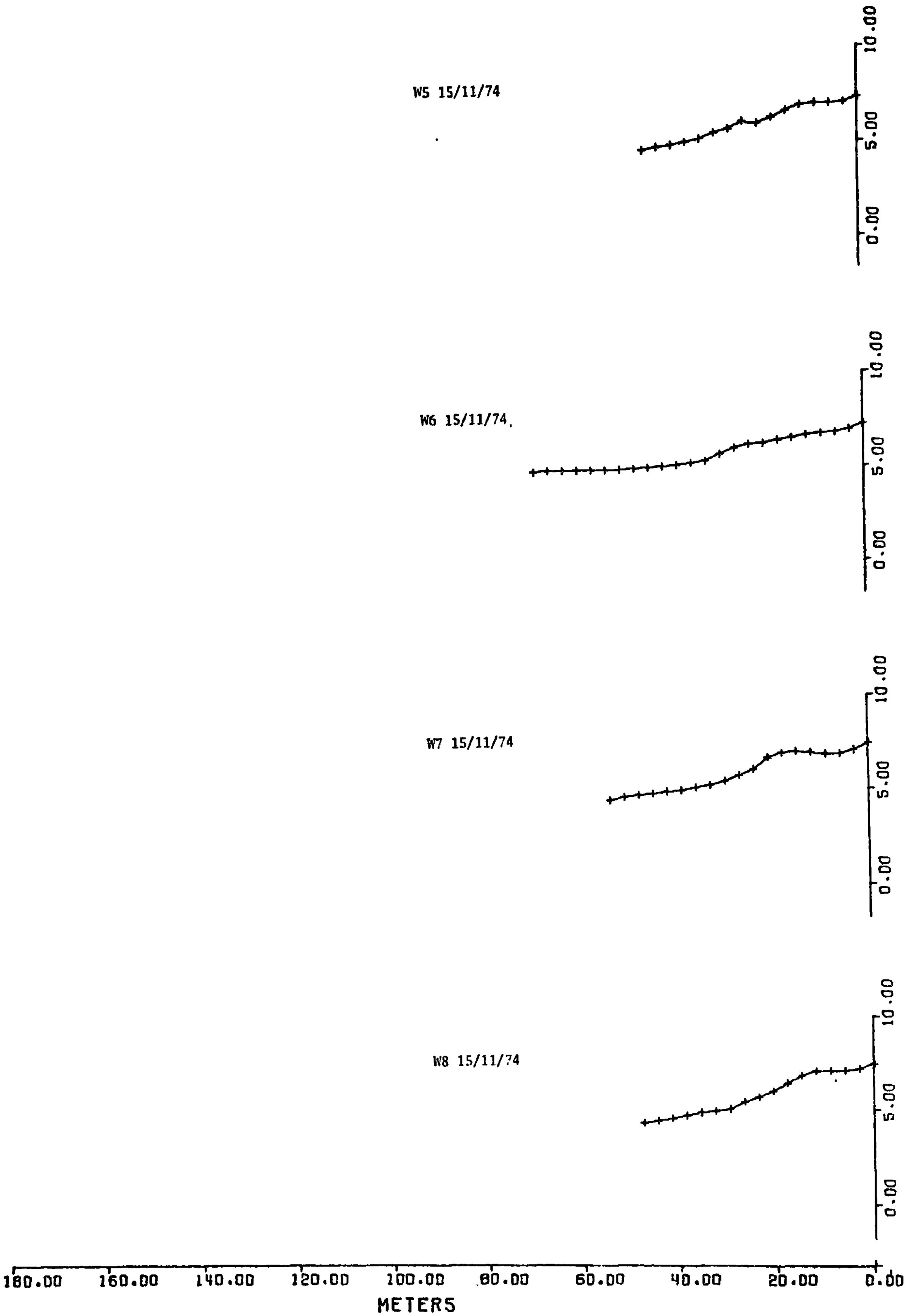
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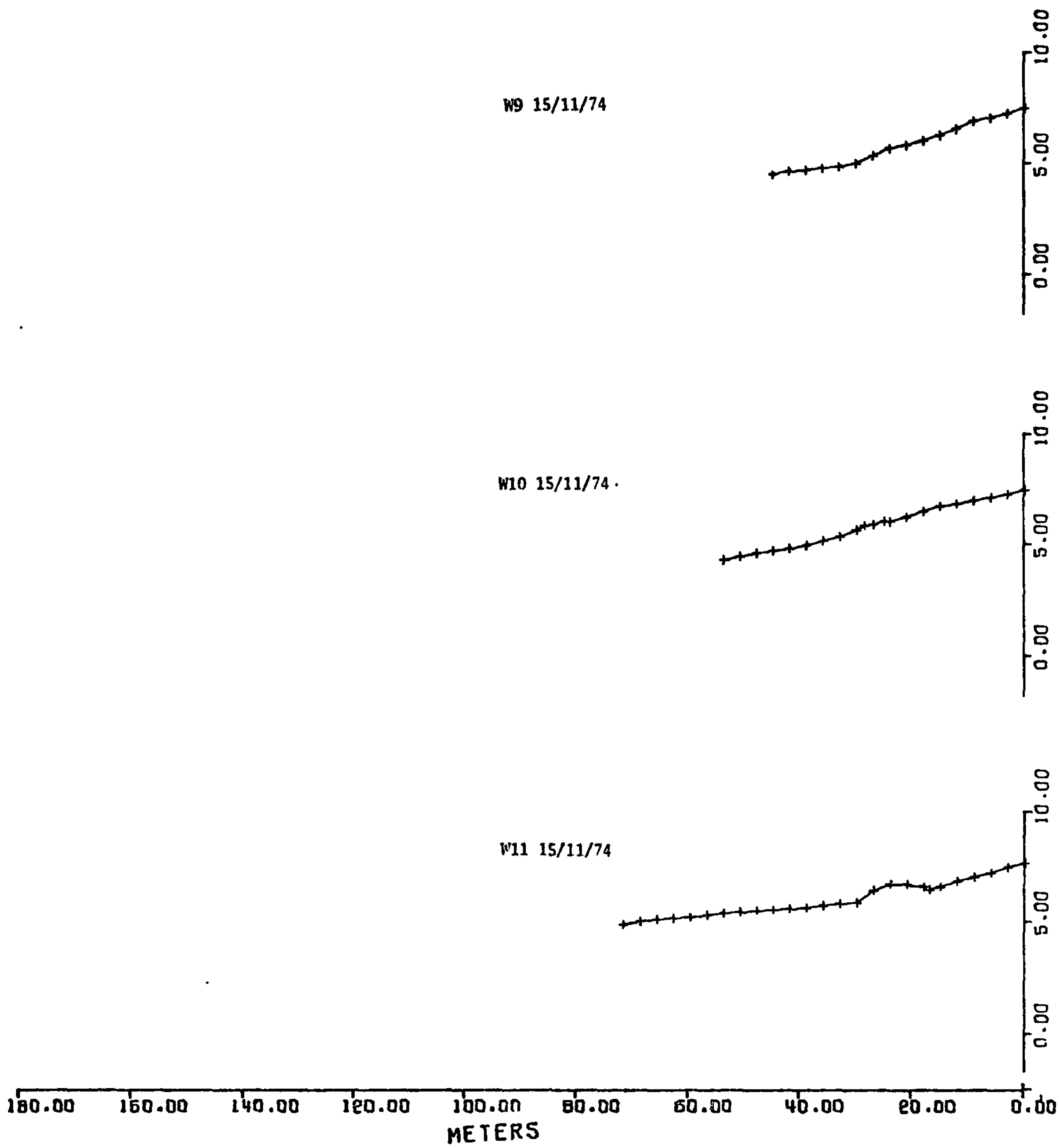
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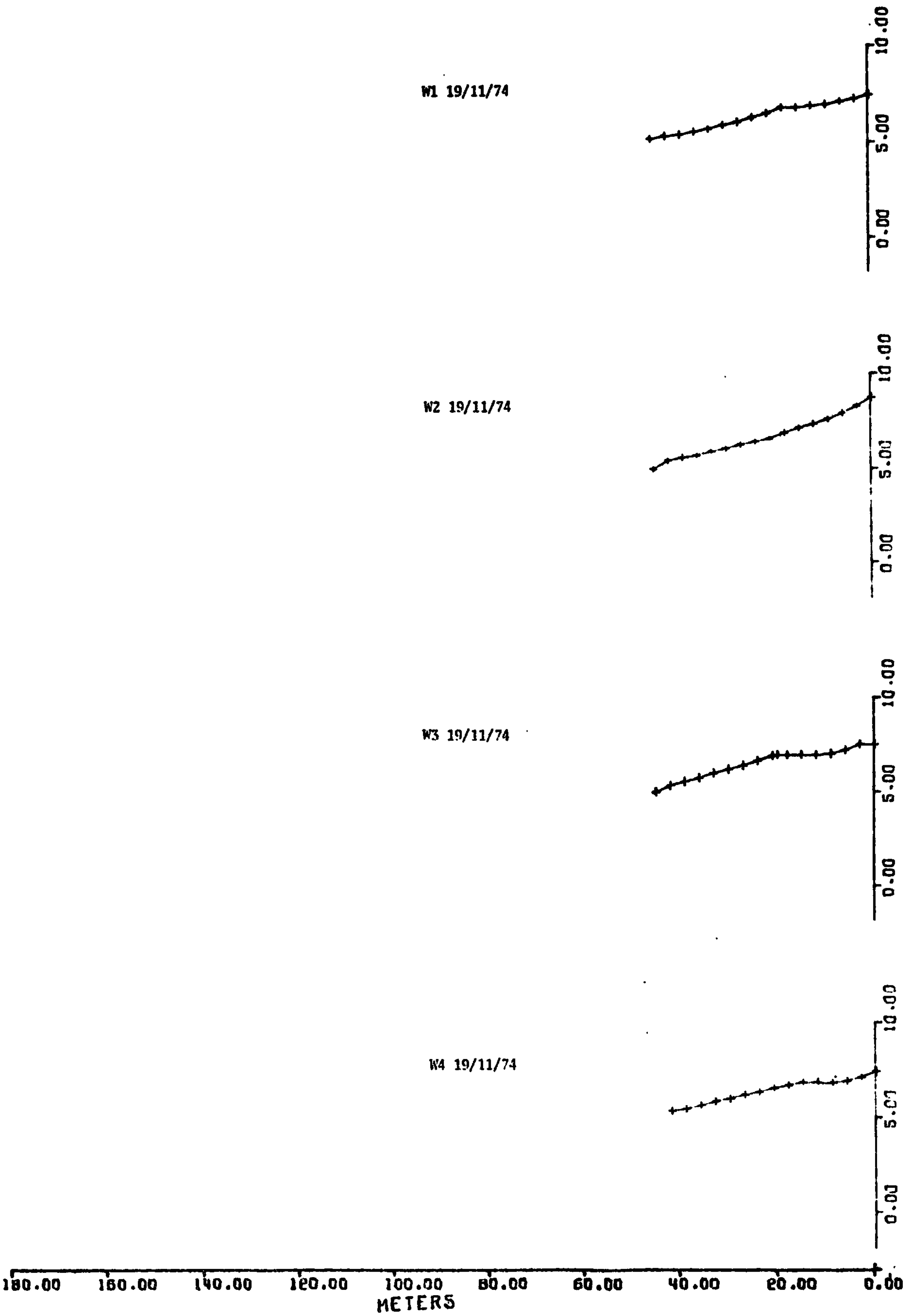
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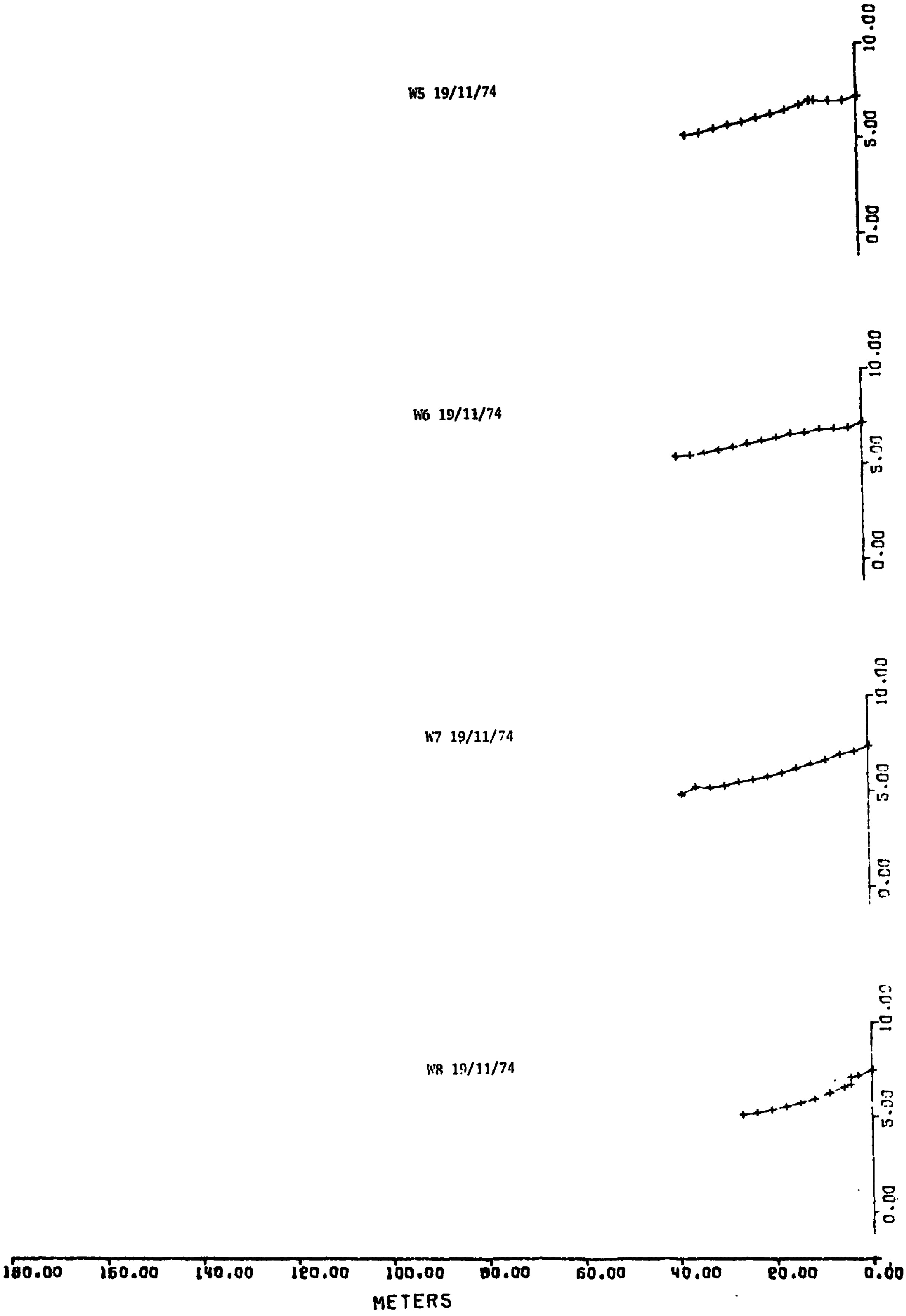
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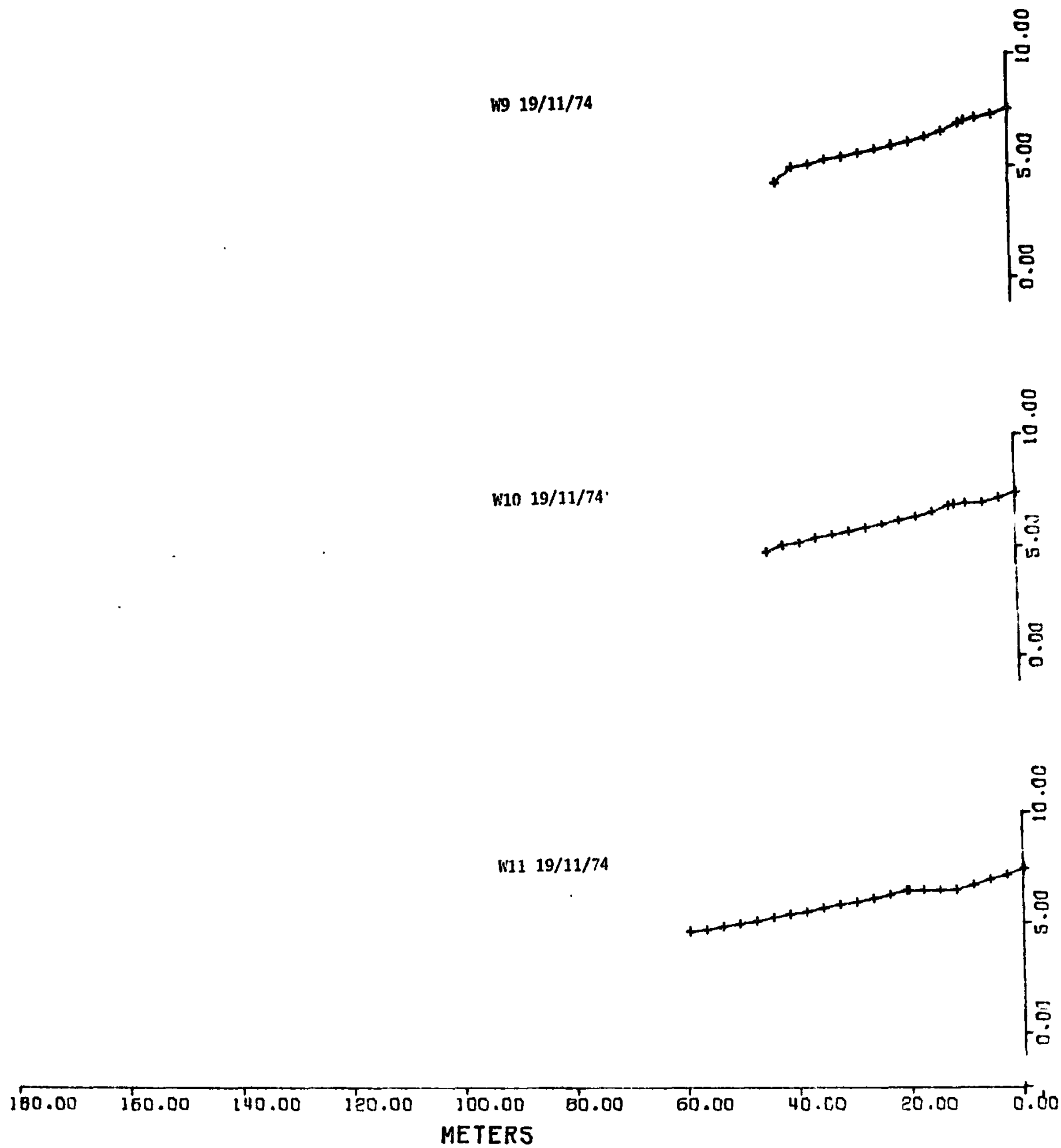
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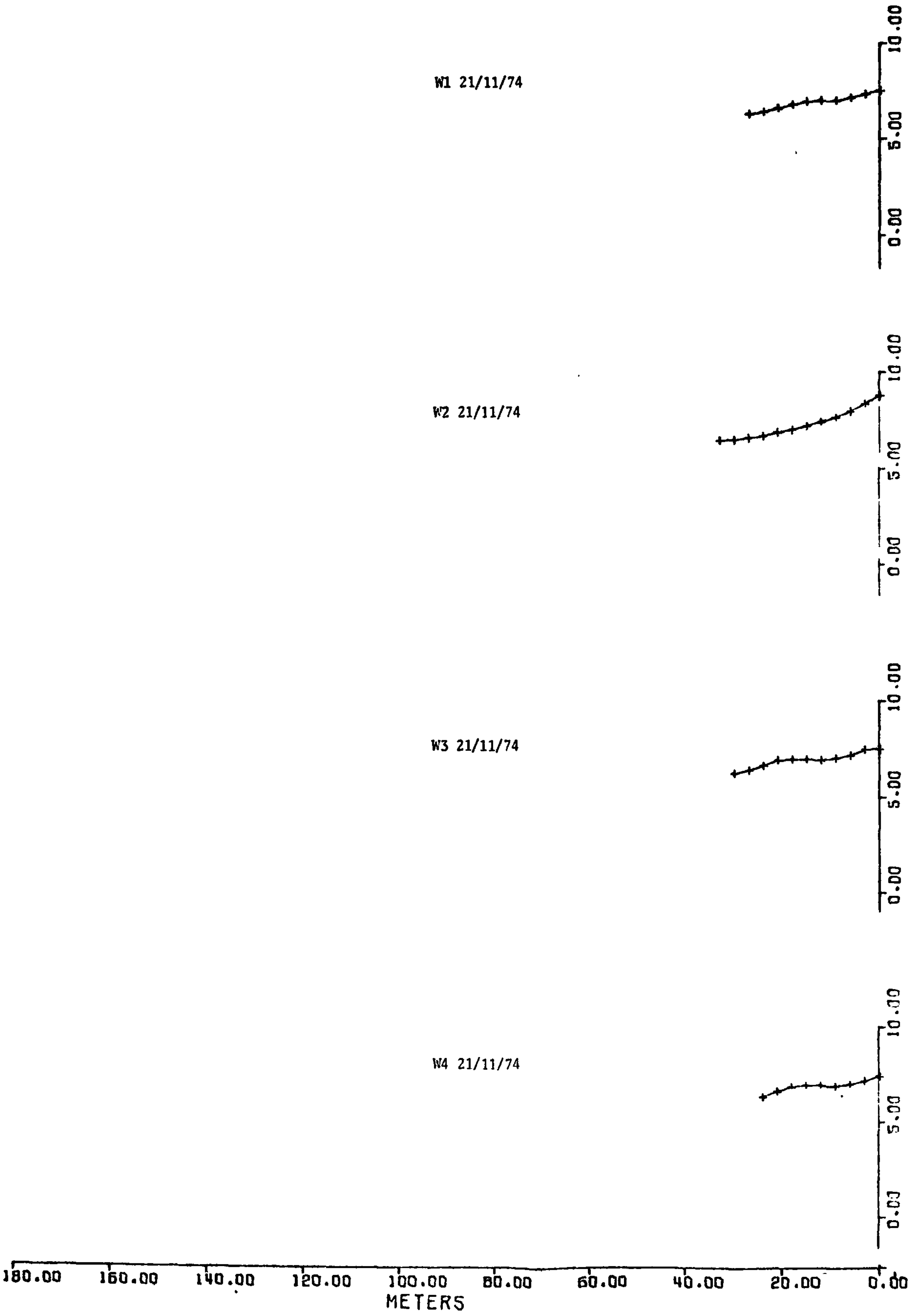
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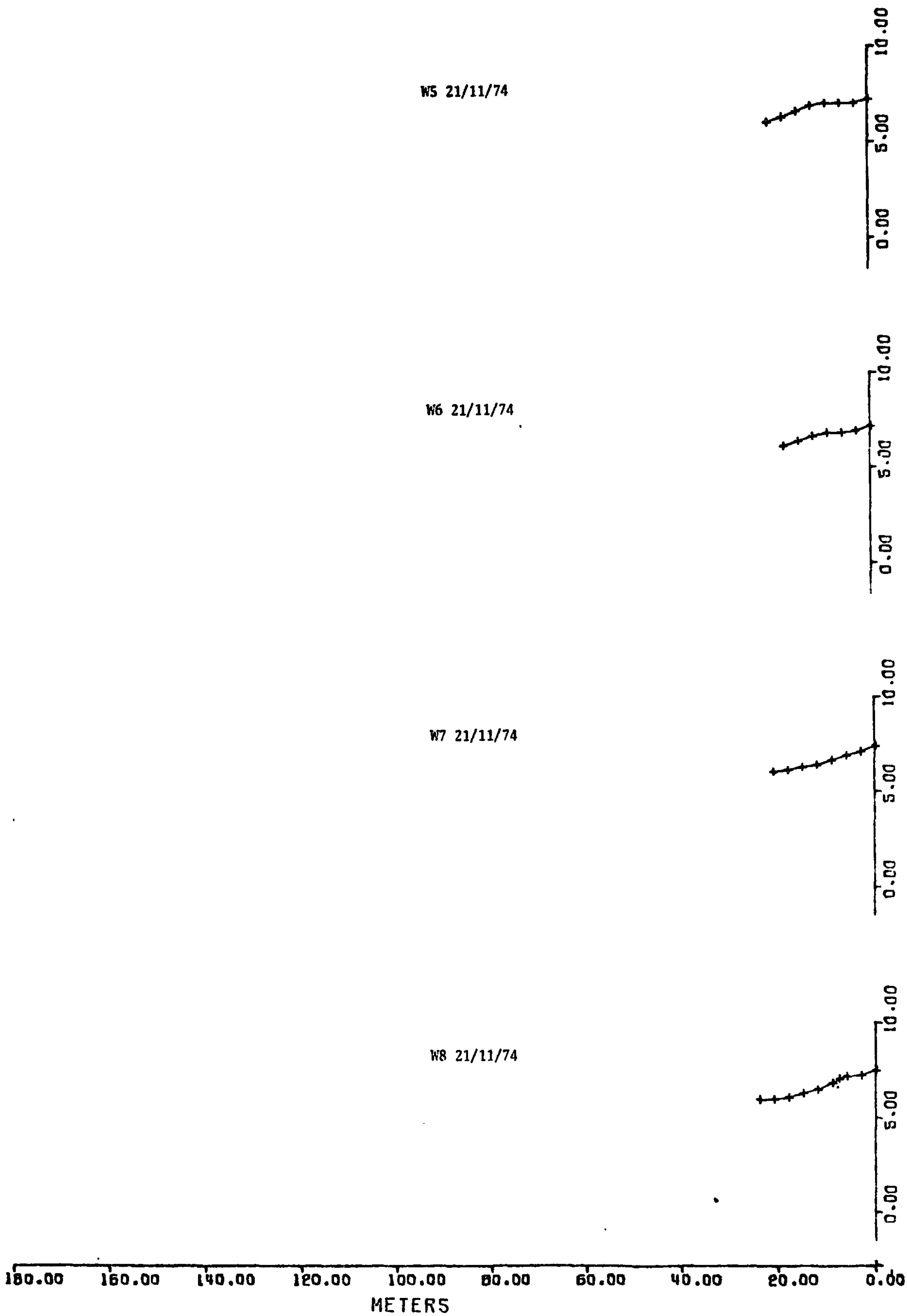
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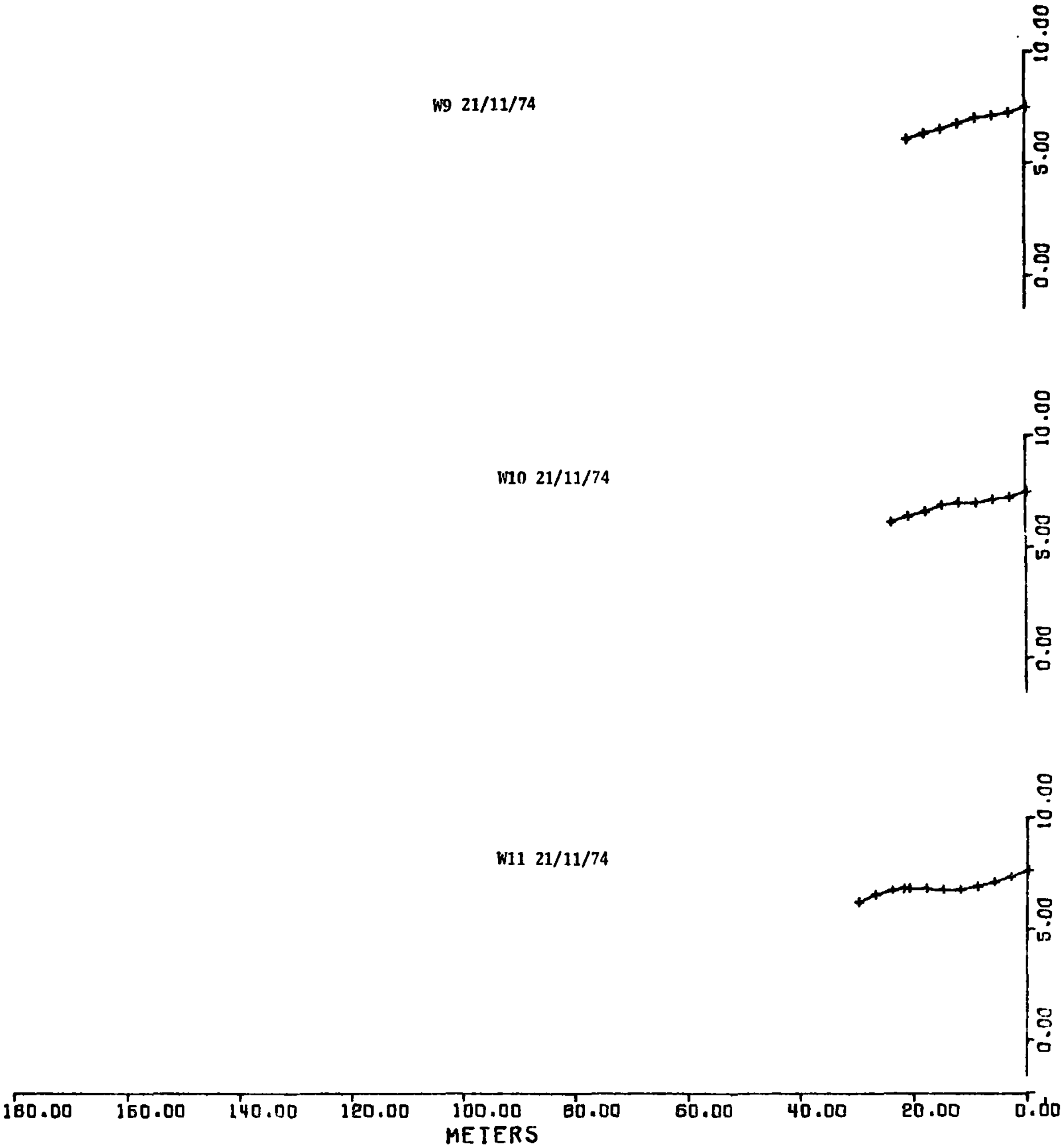
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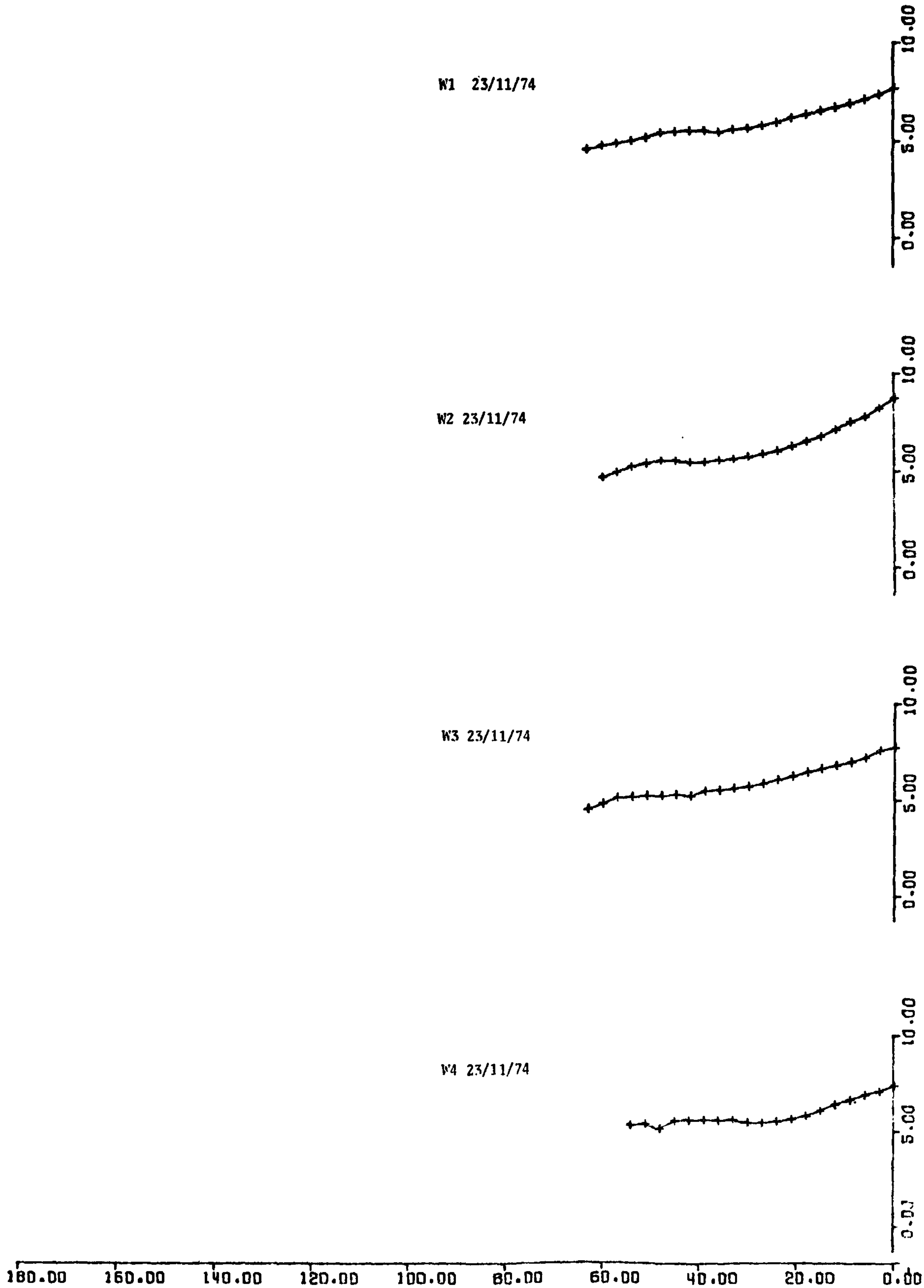

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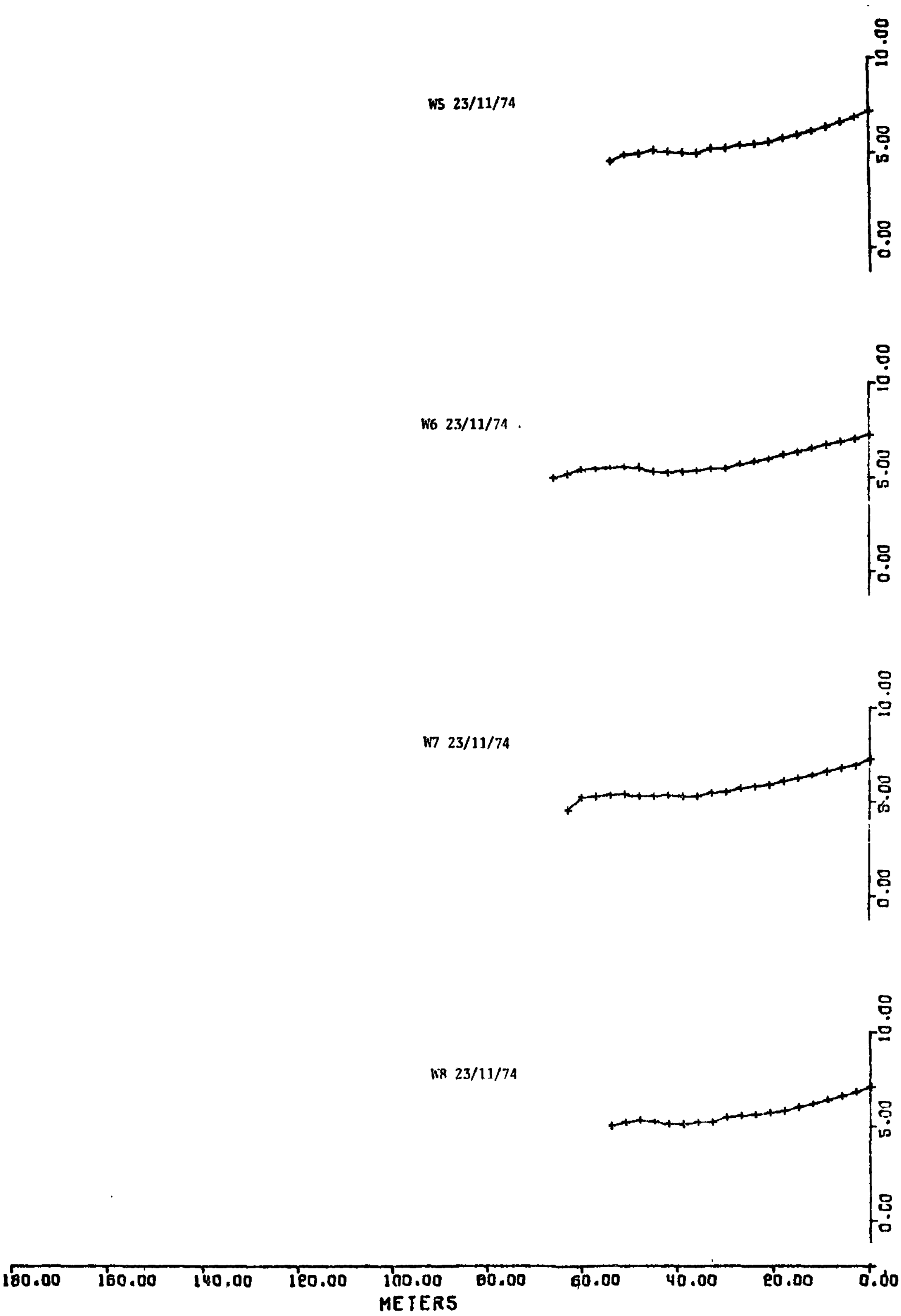
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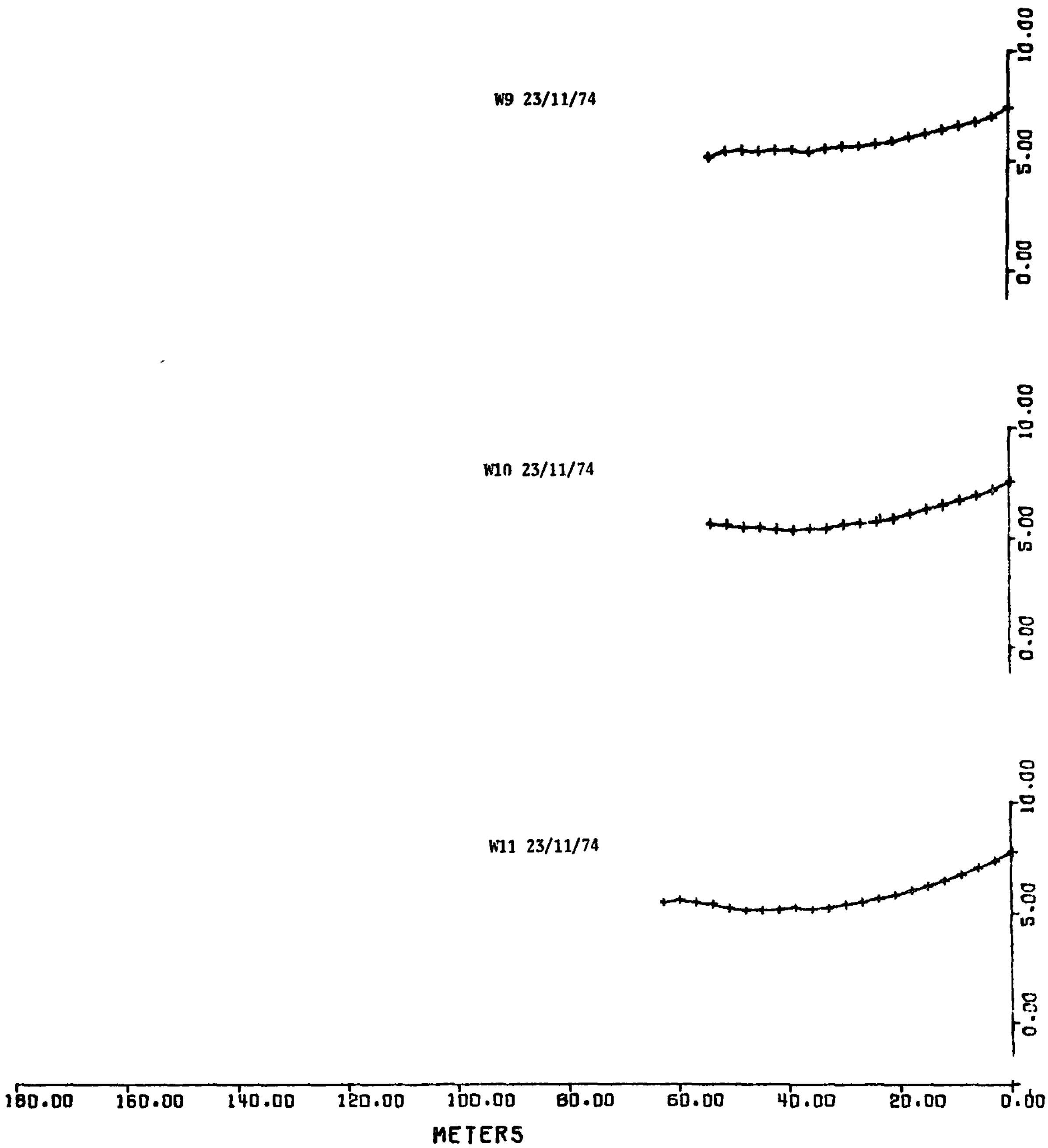
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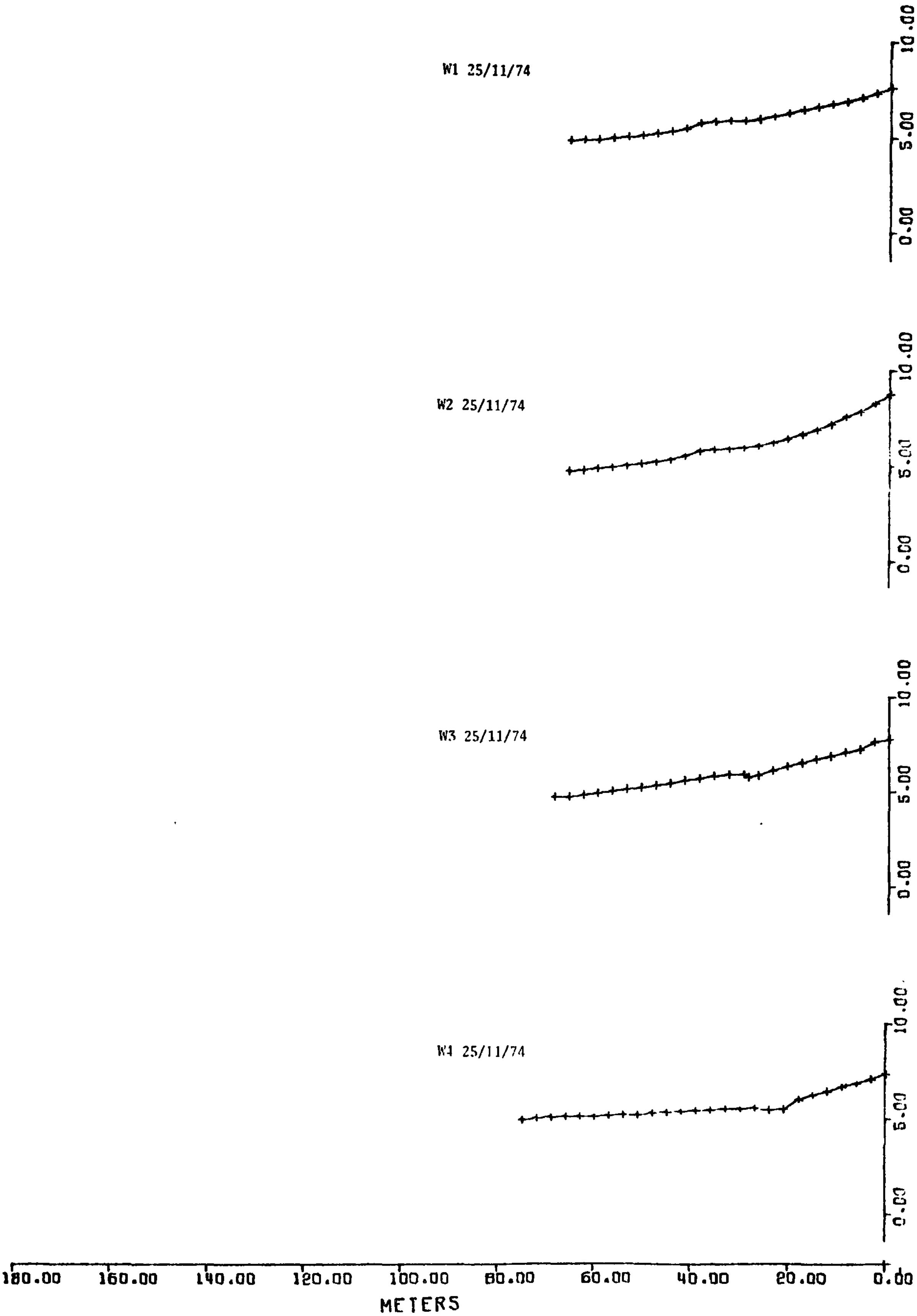
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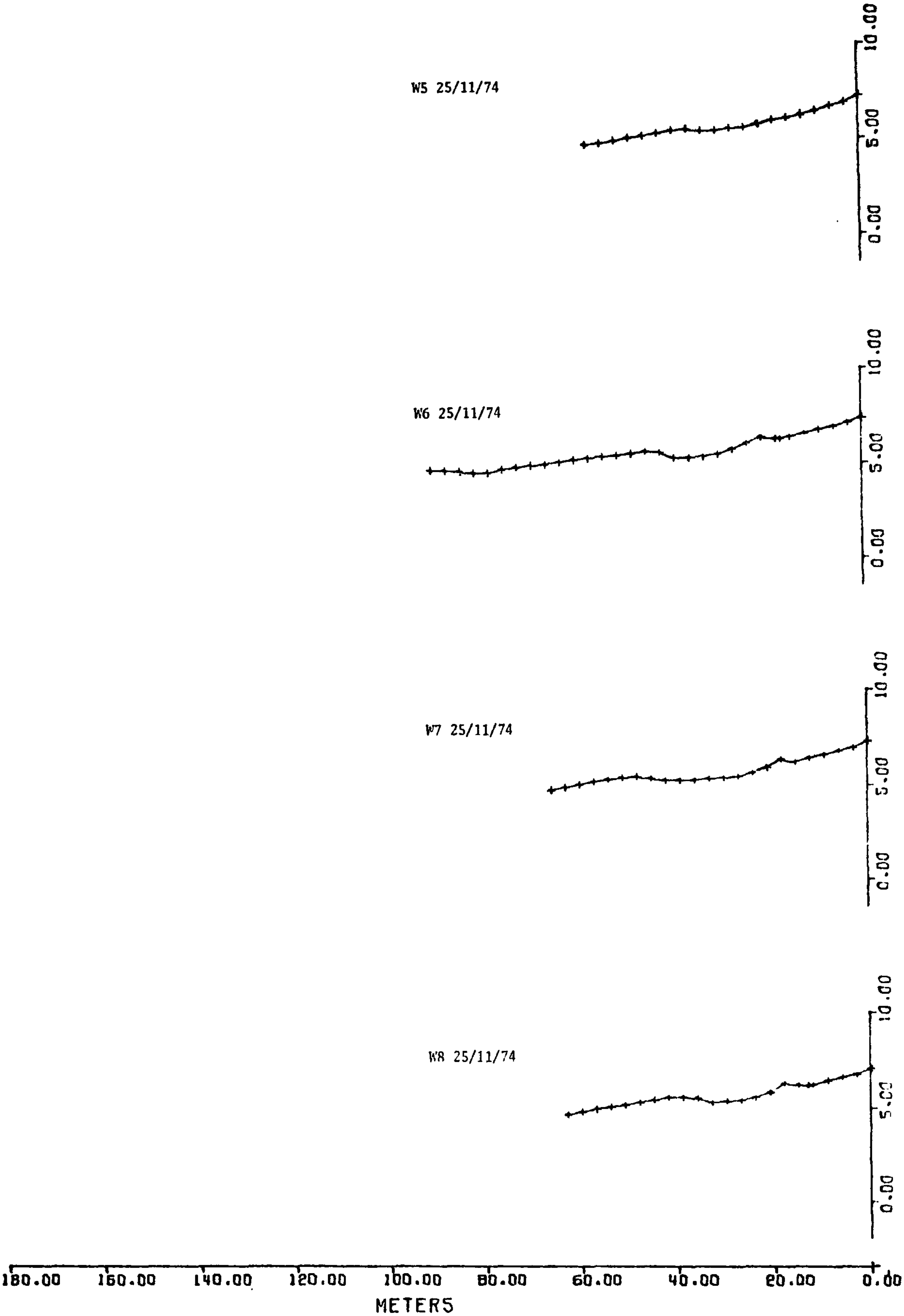
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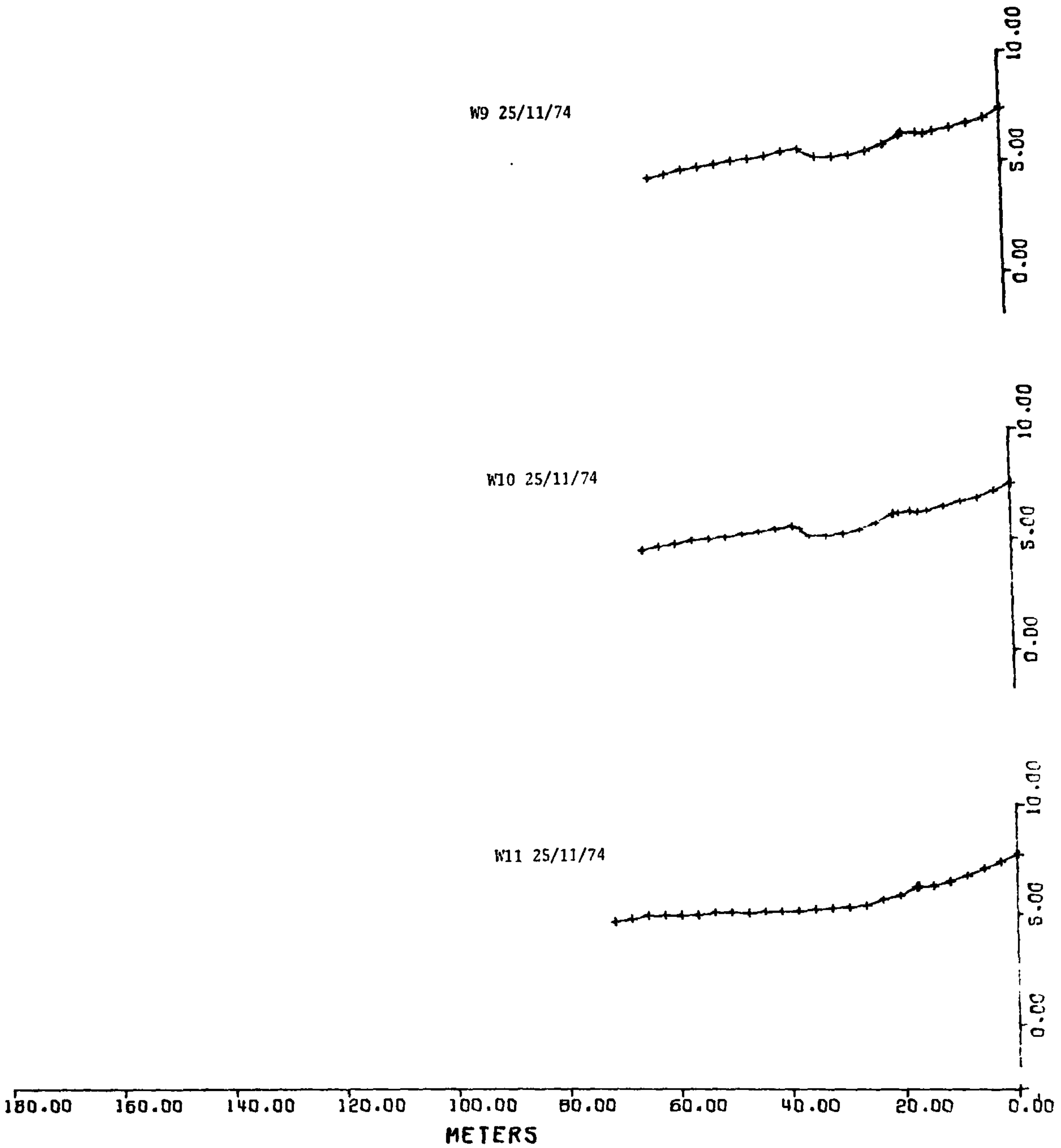
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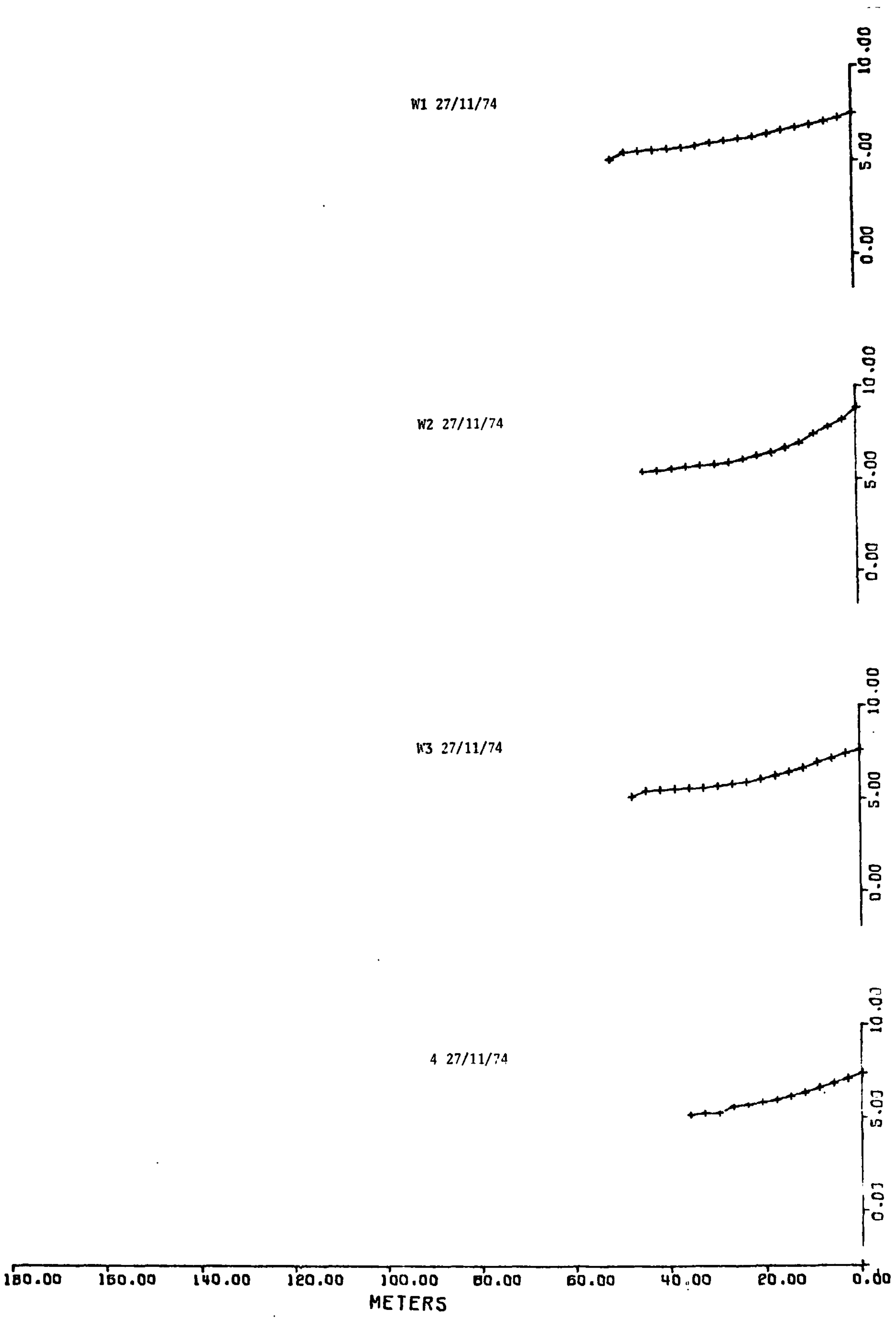
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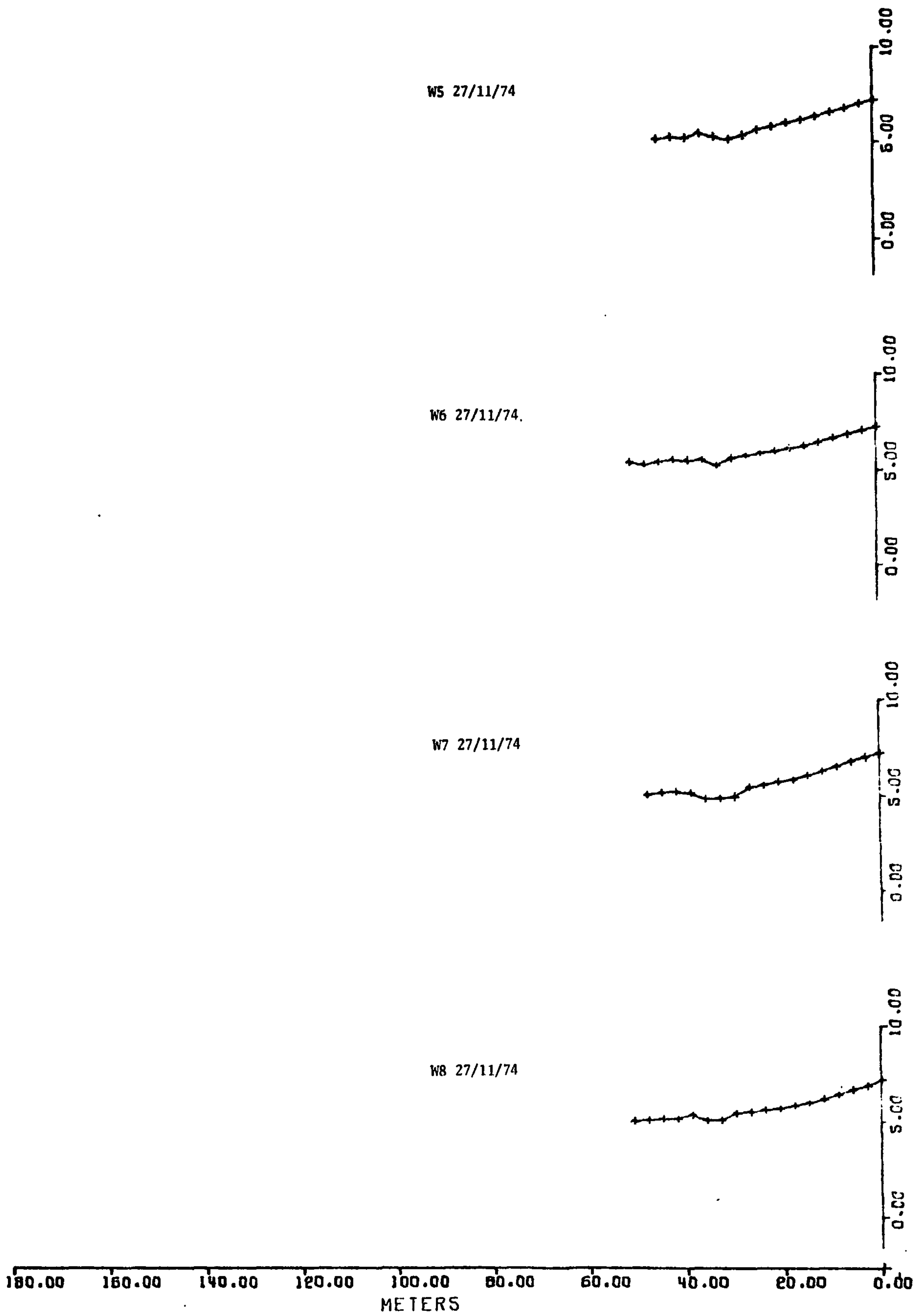
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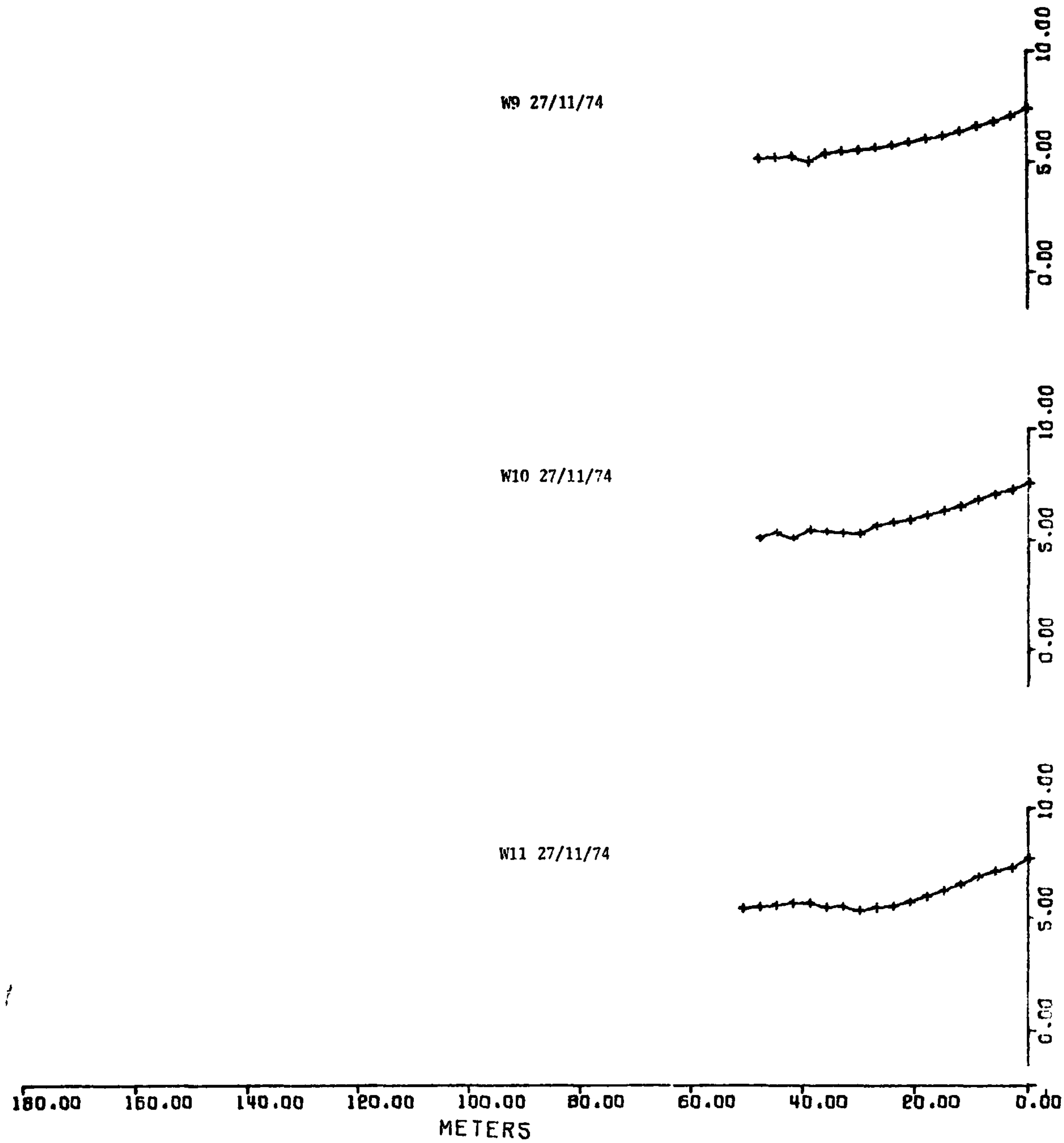
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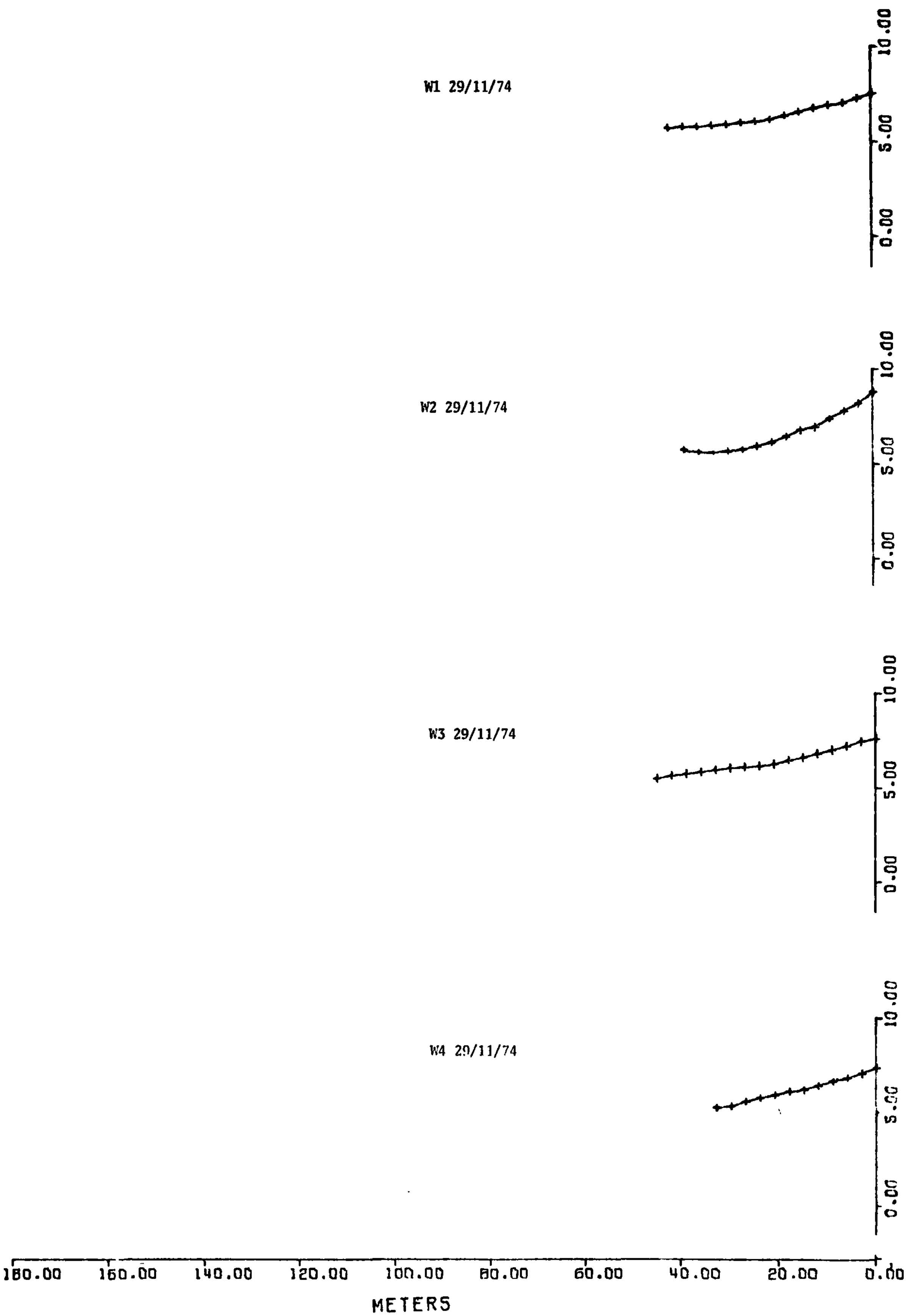
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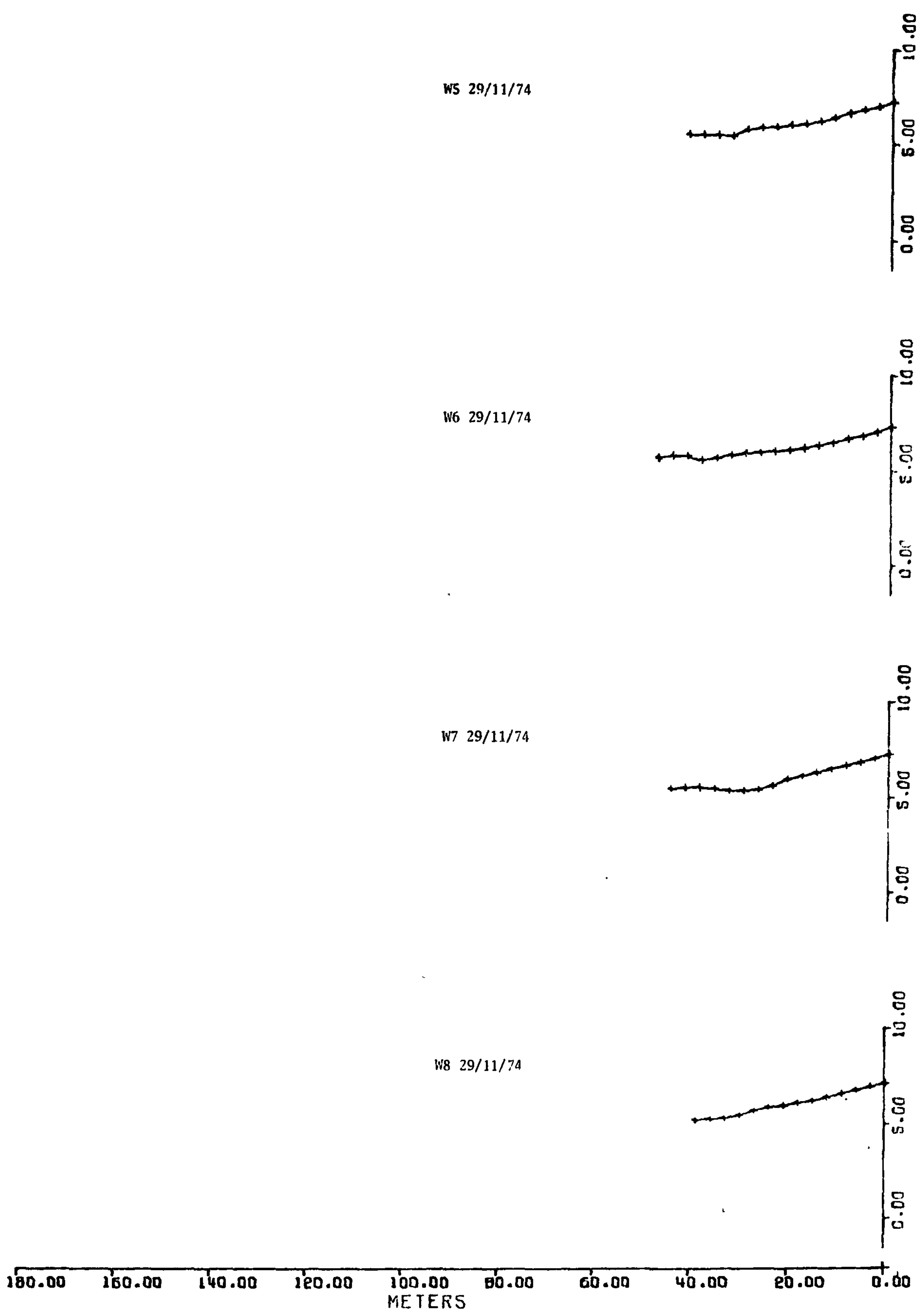
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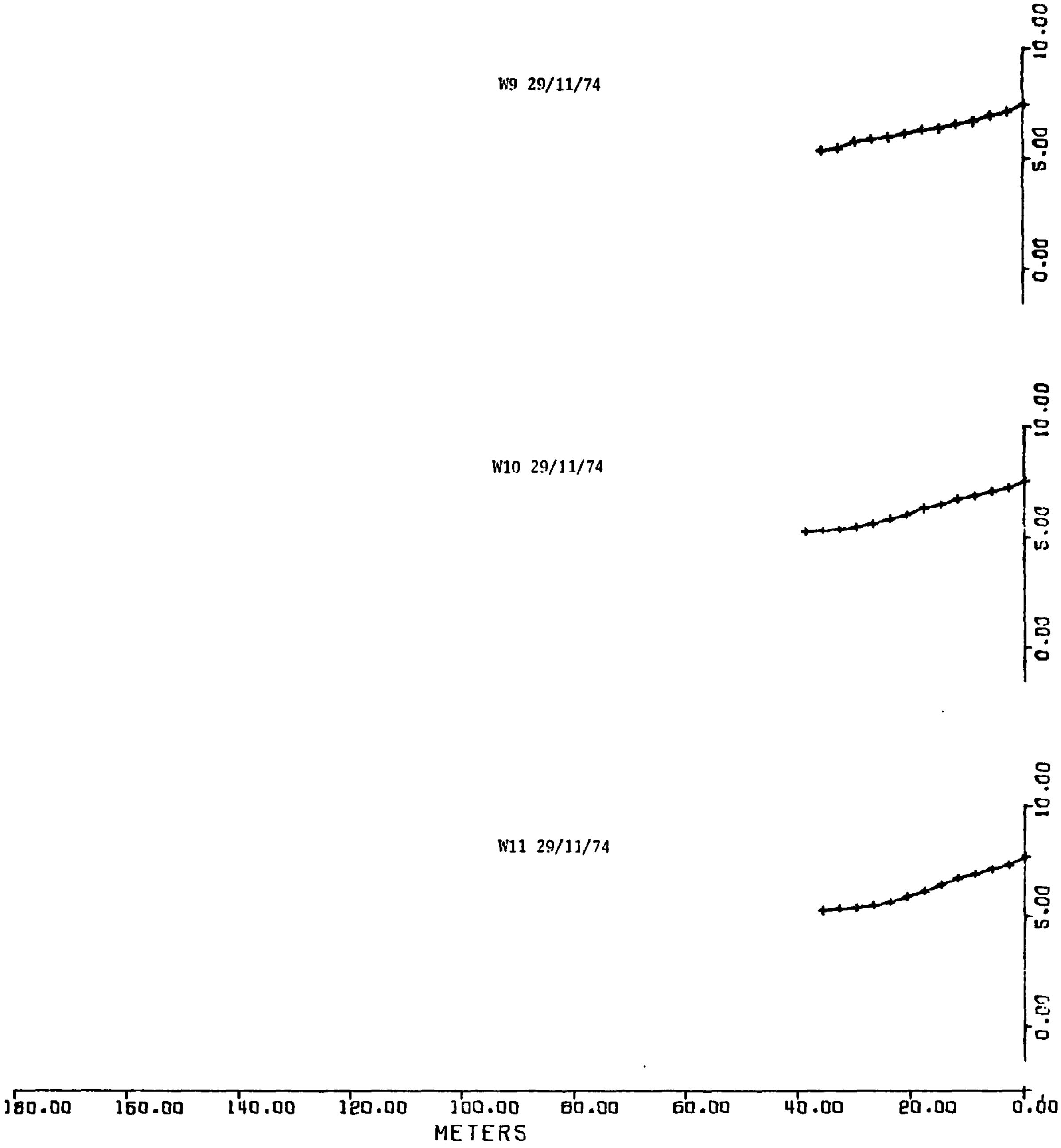
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PROFILE PLOTS

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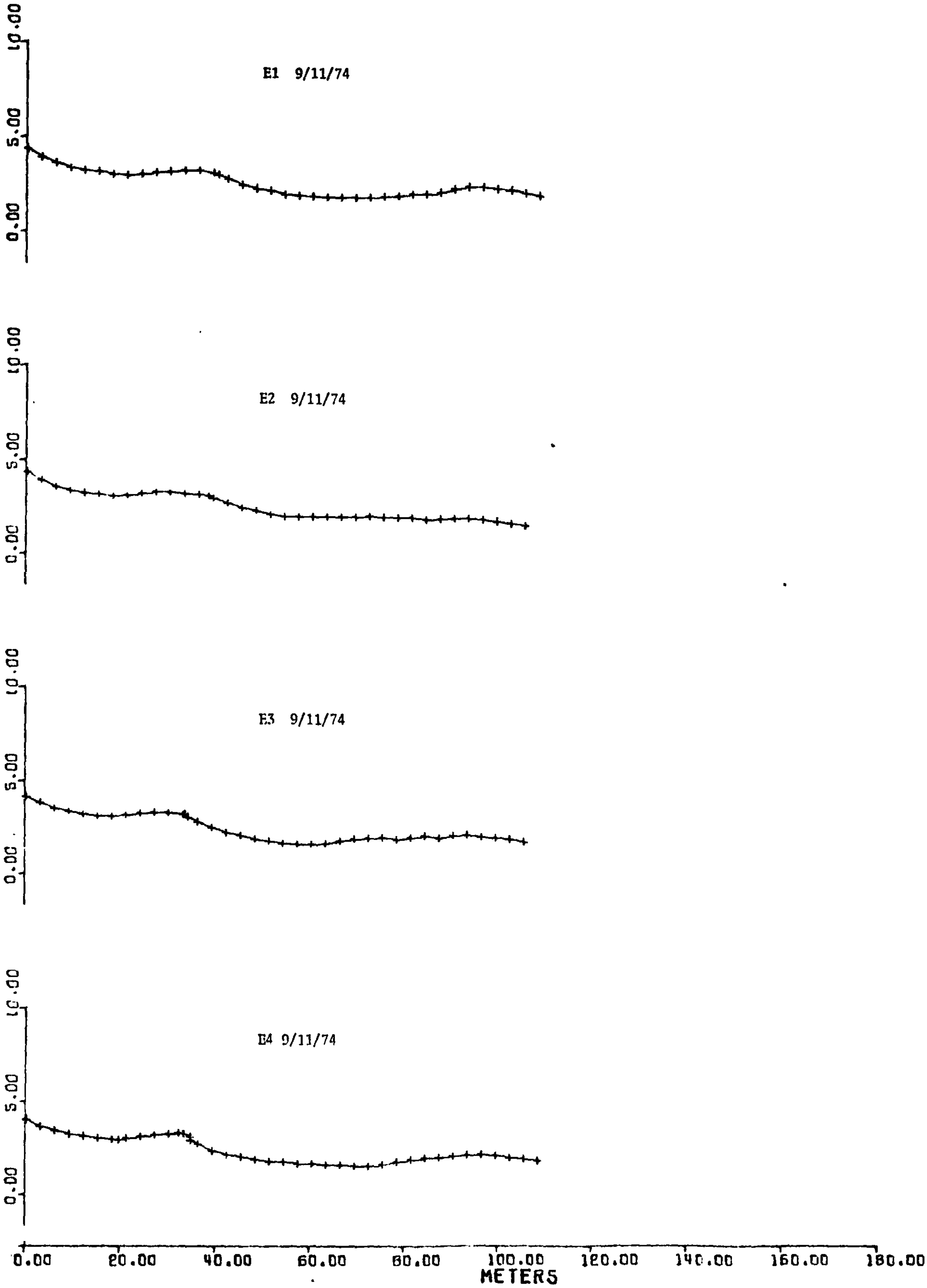
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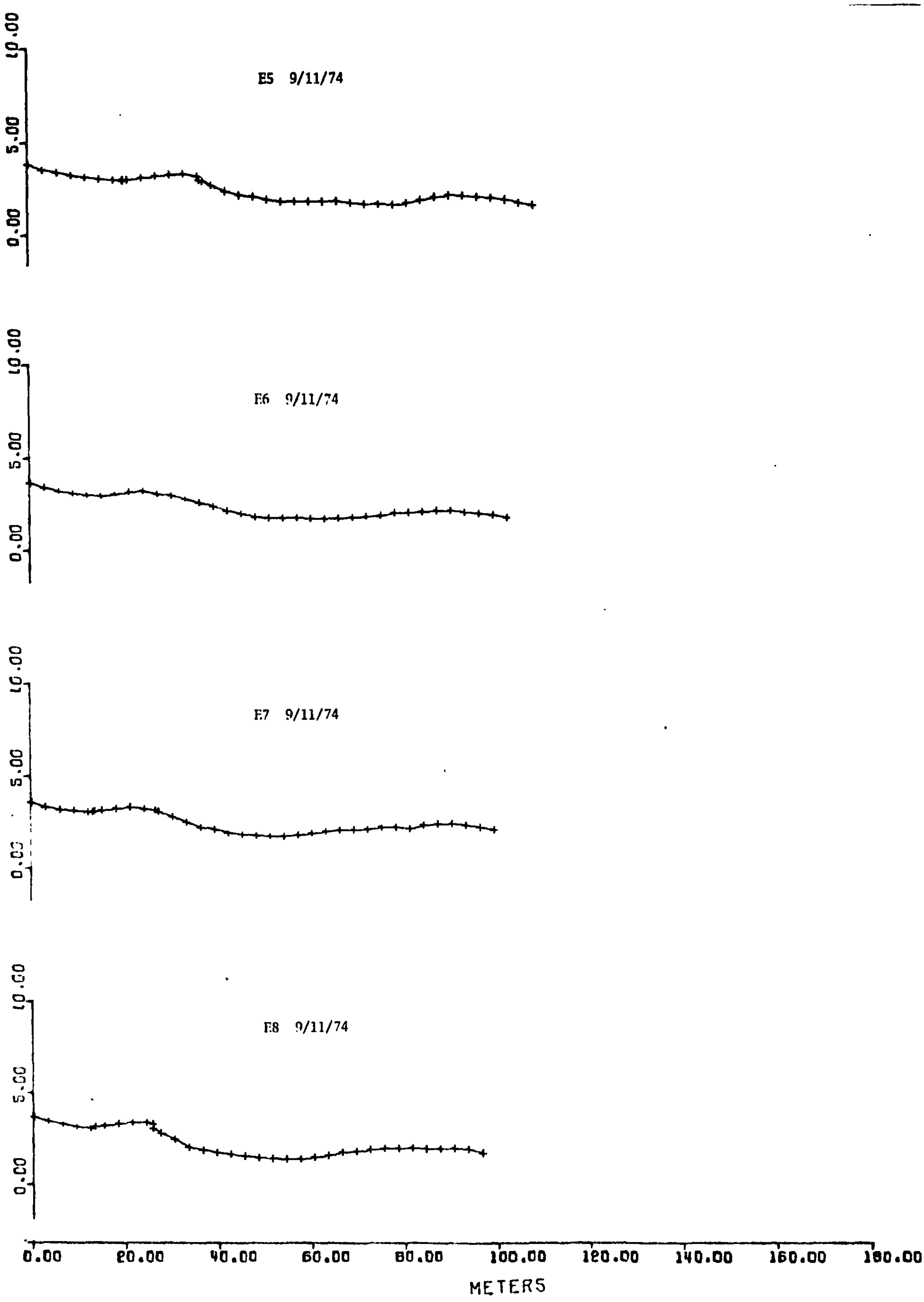
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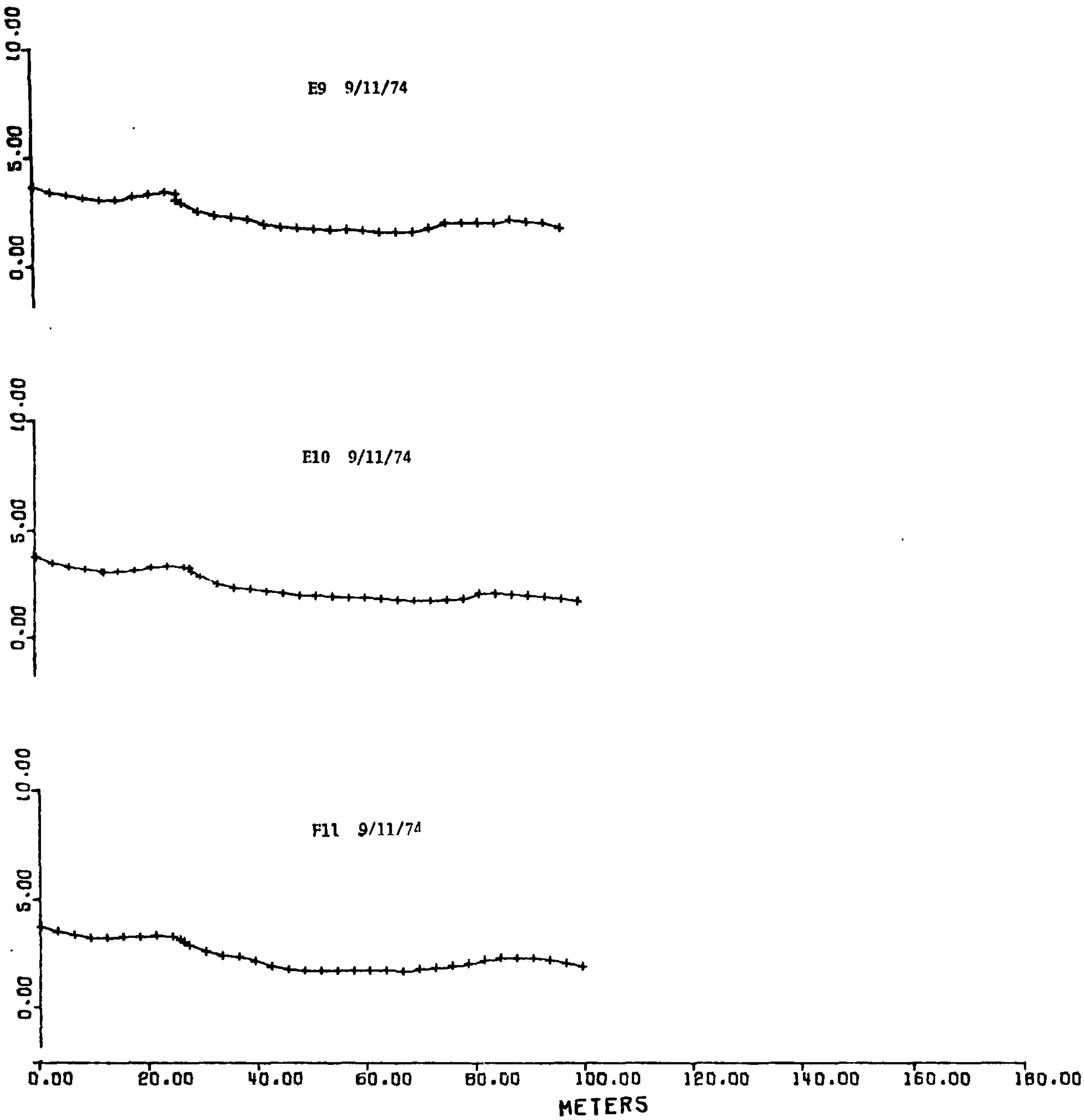
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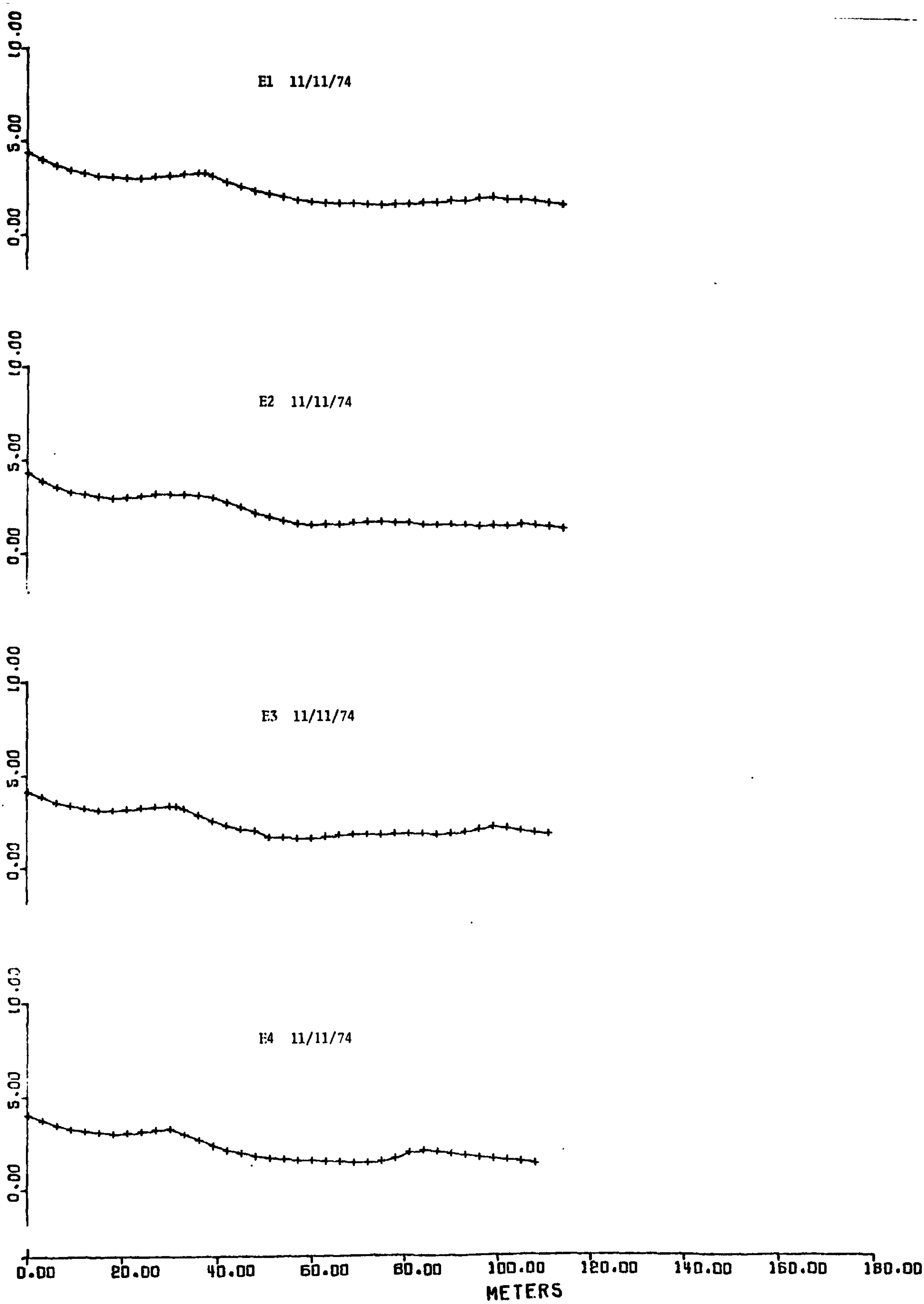
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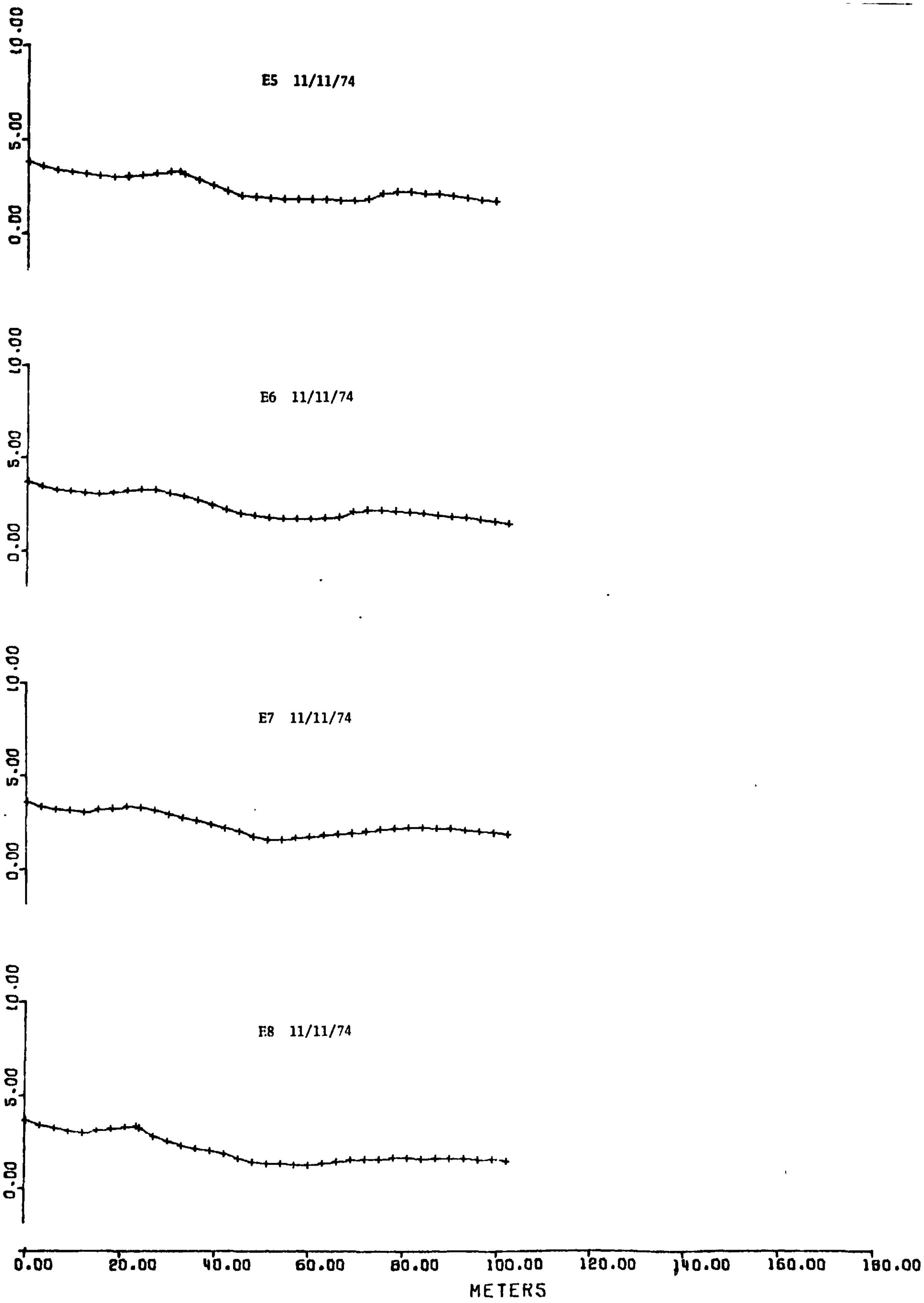
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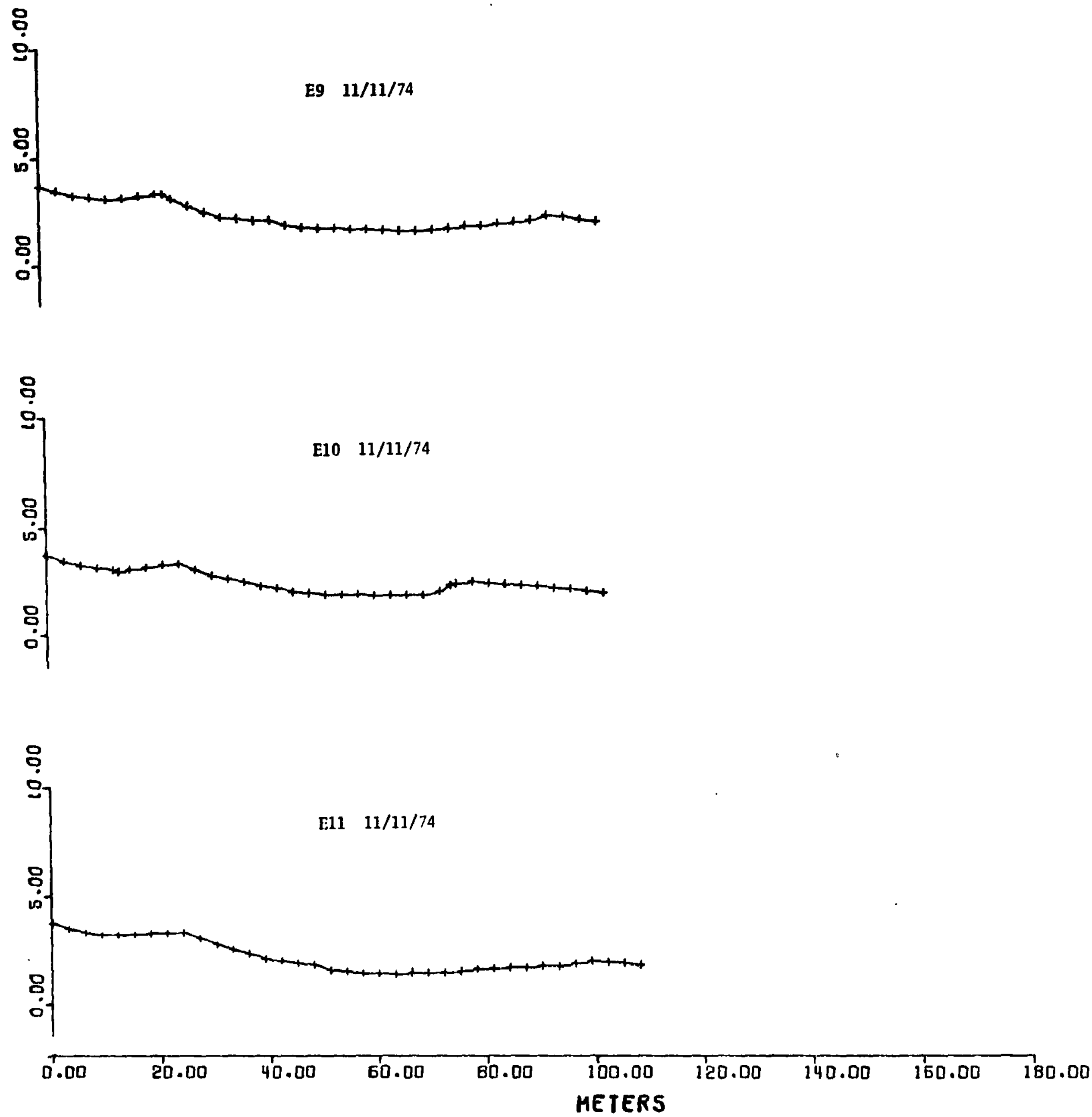
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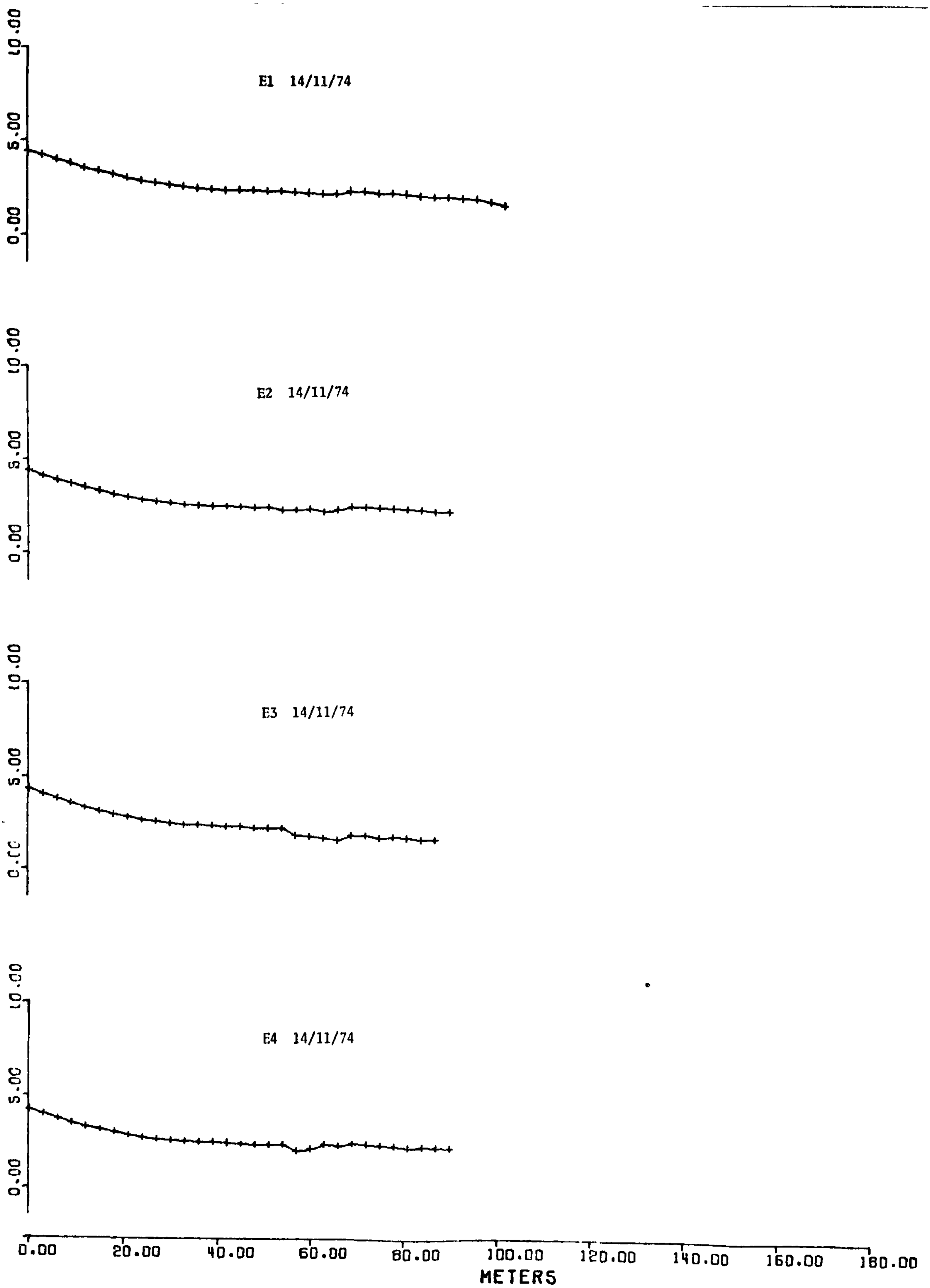
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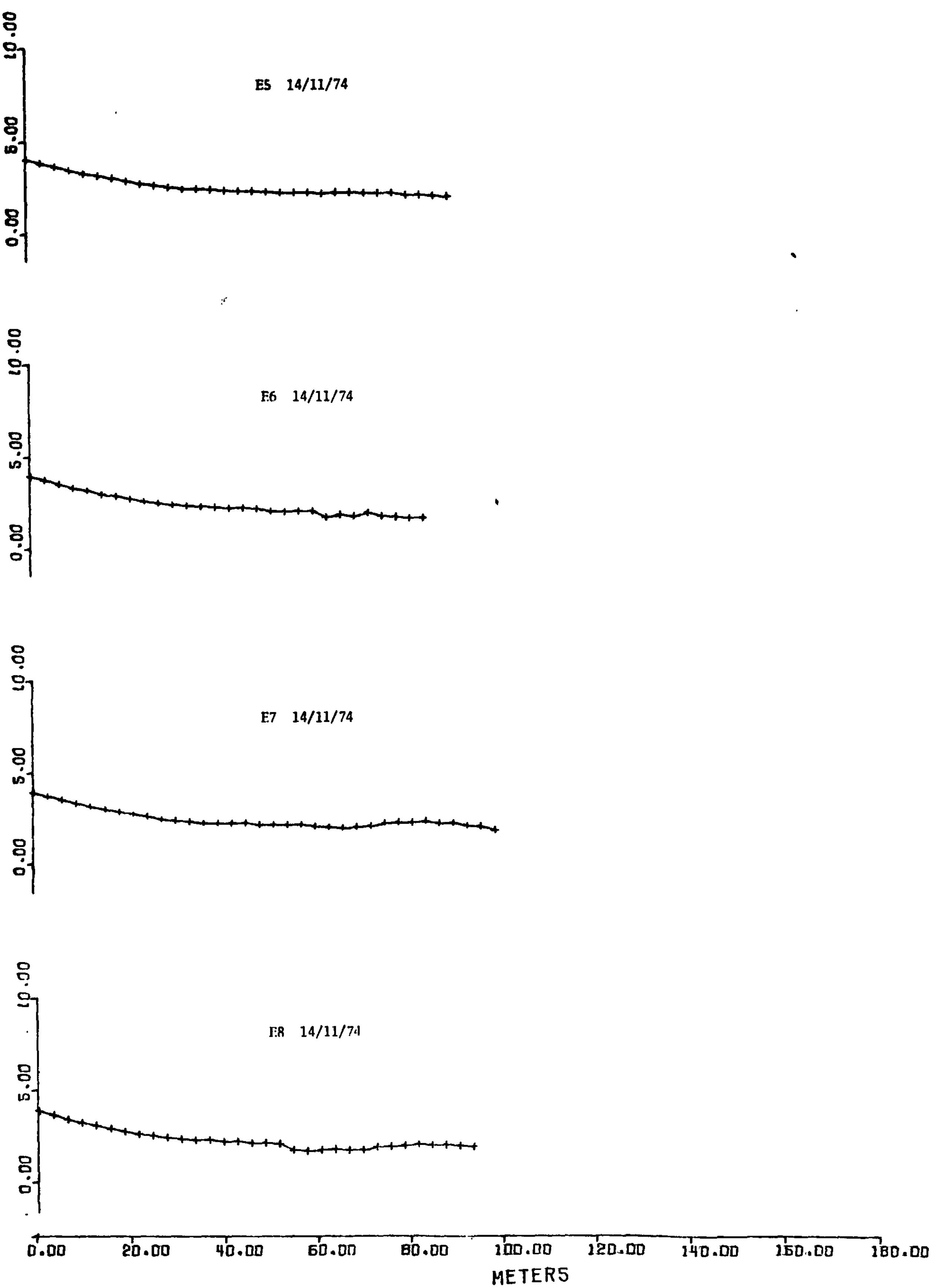
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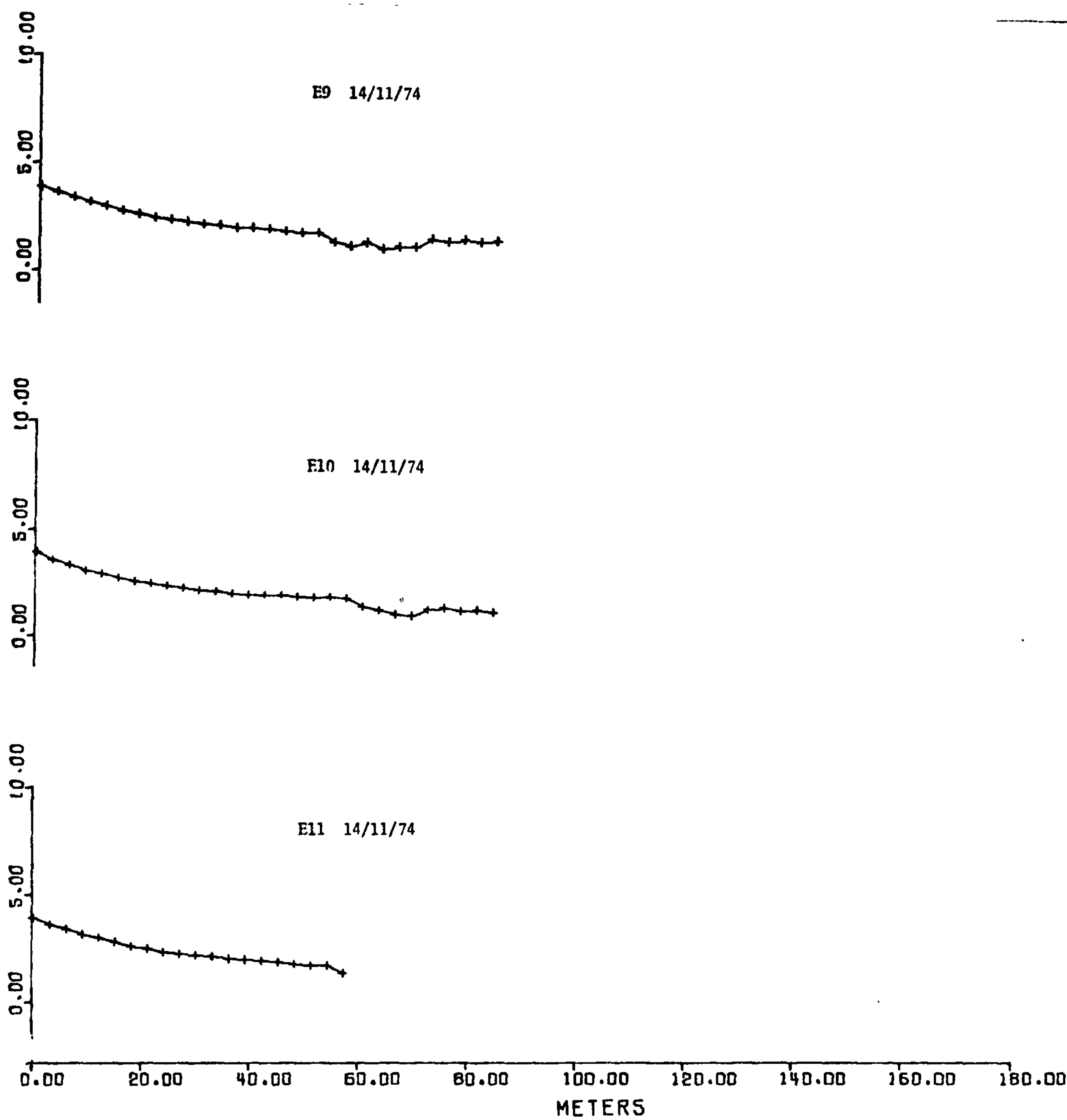
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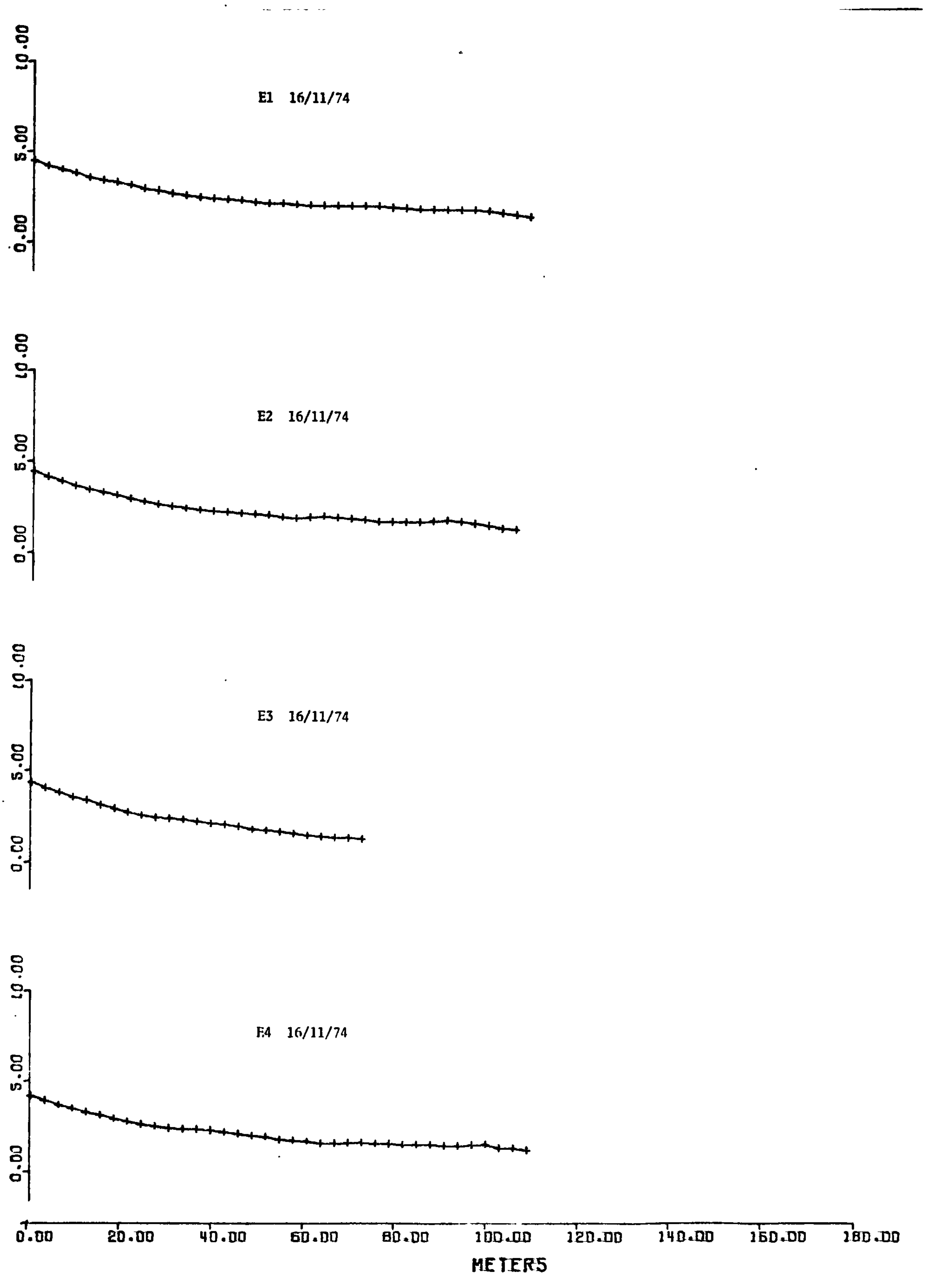
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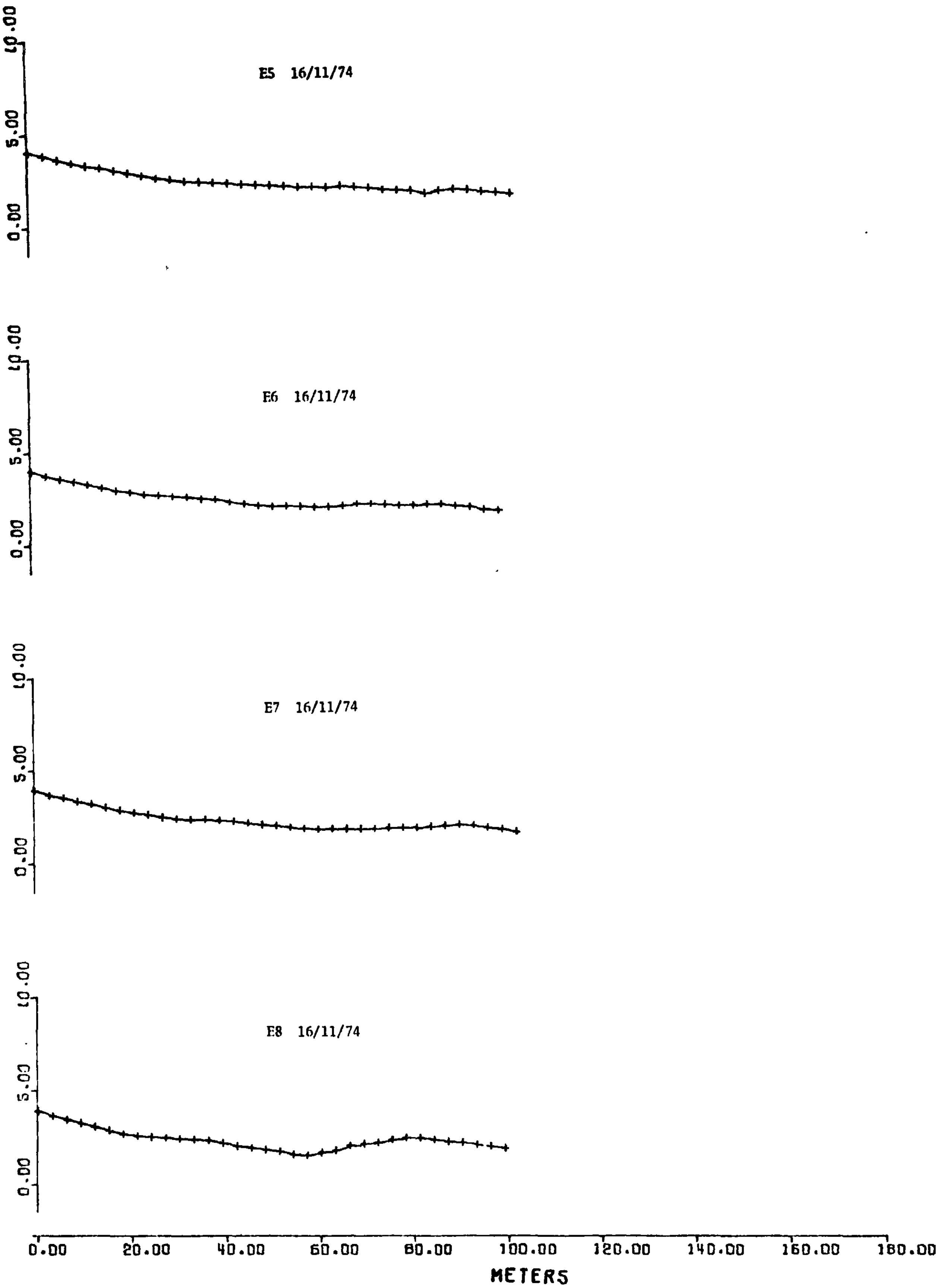

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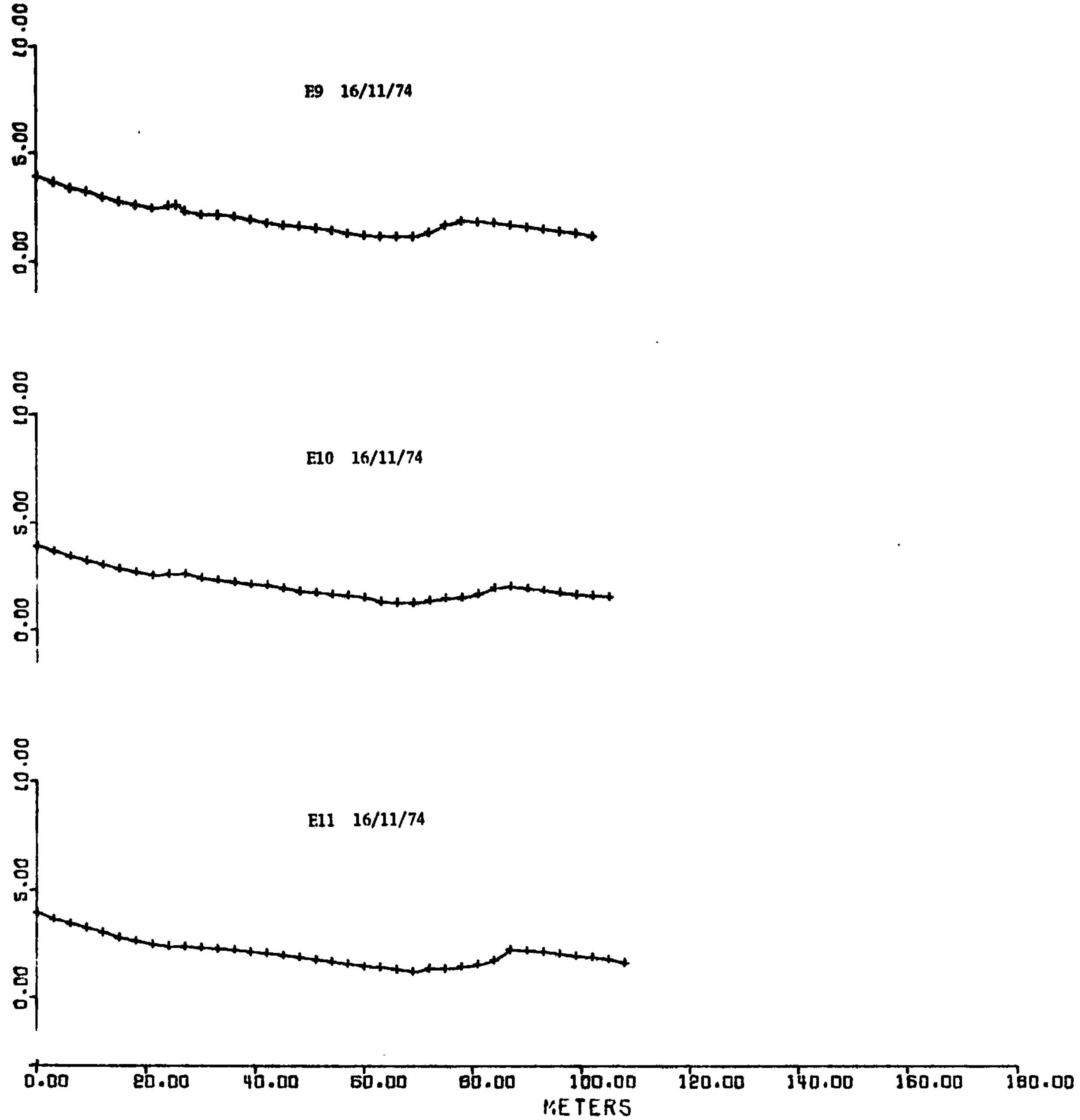
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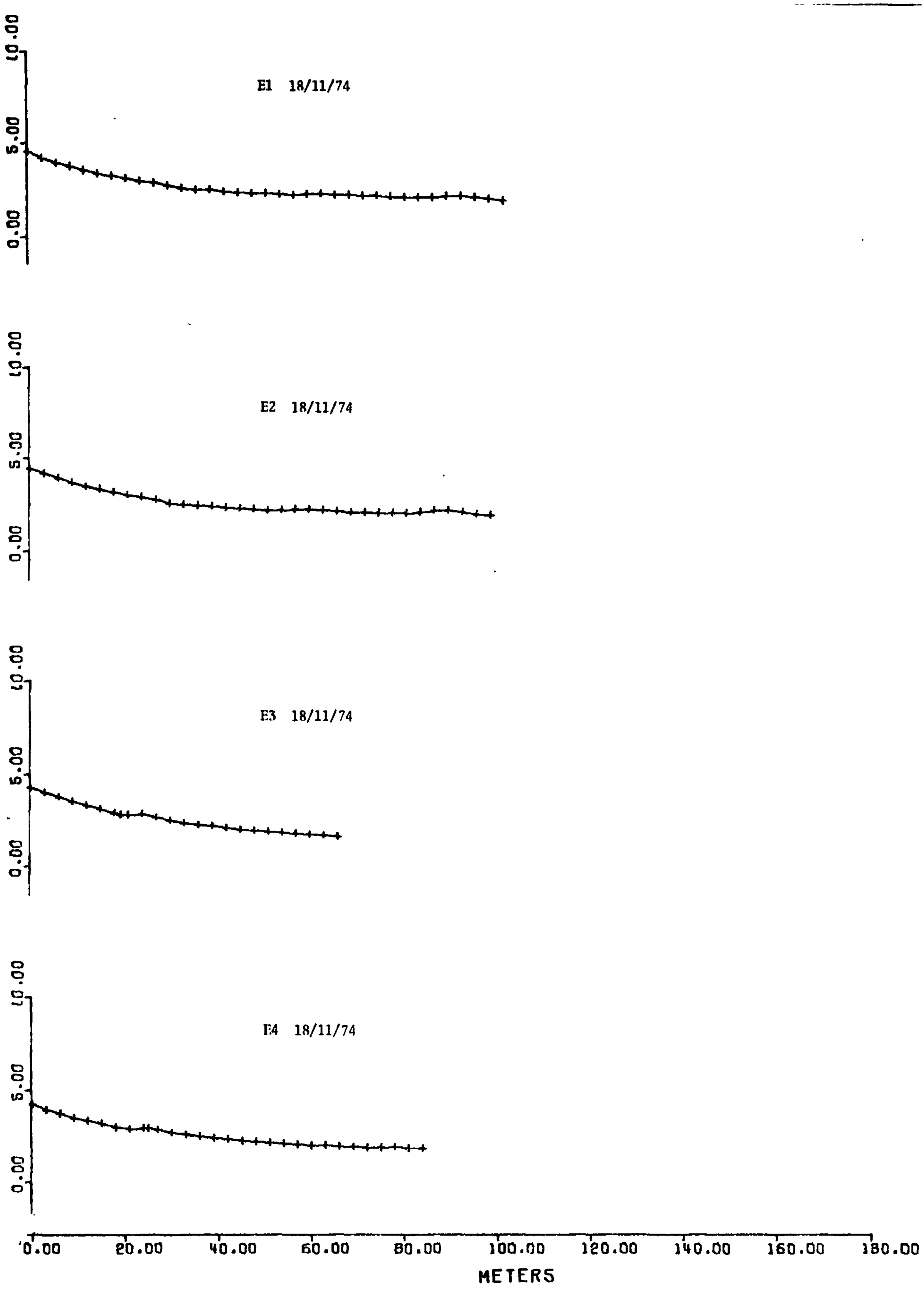

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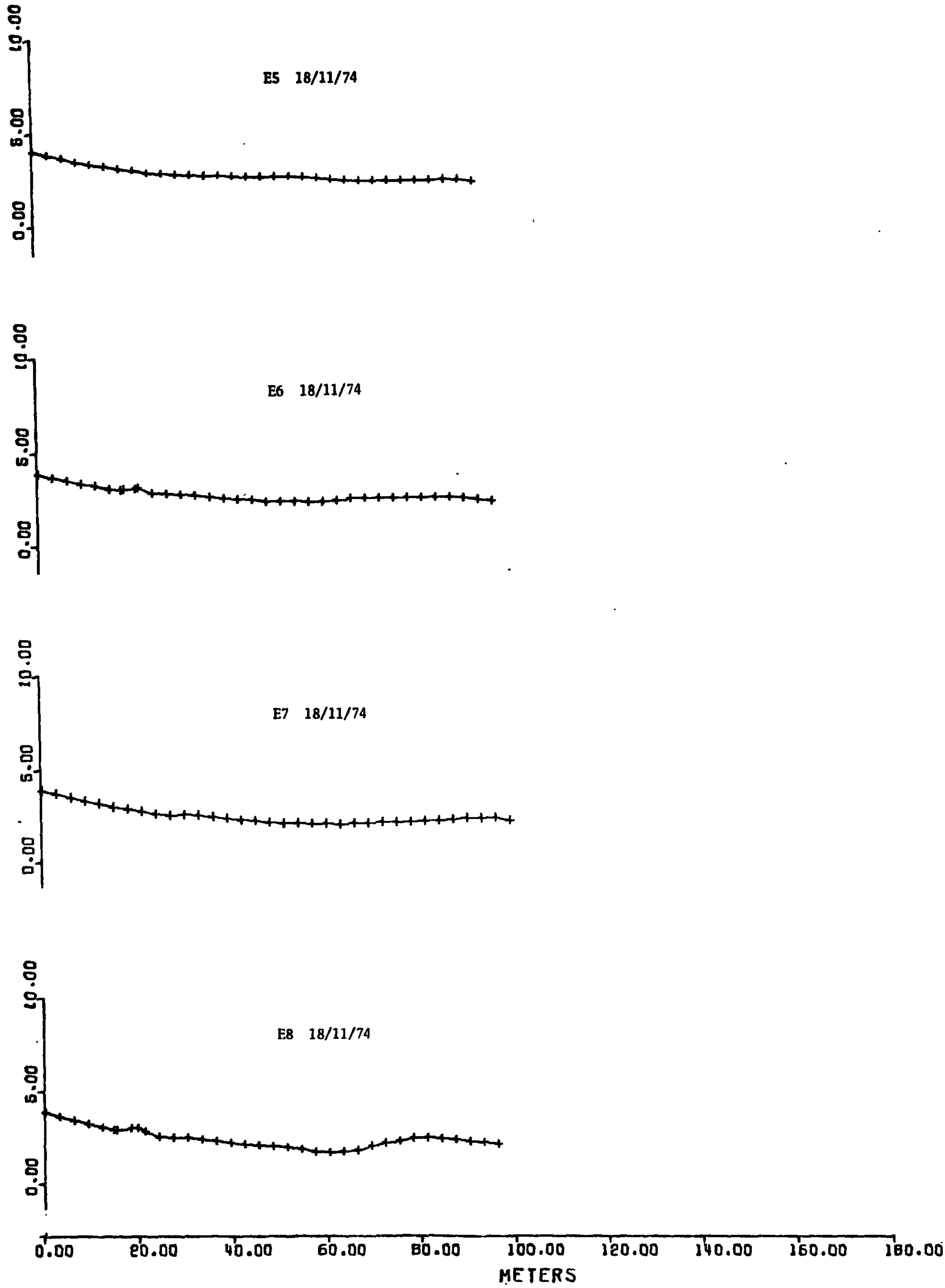
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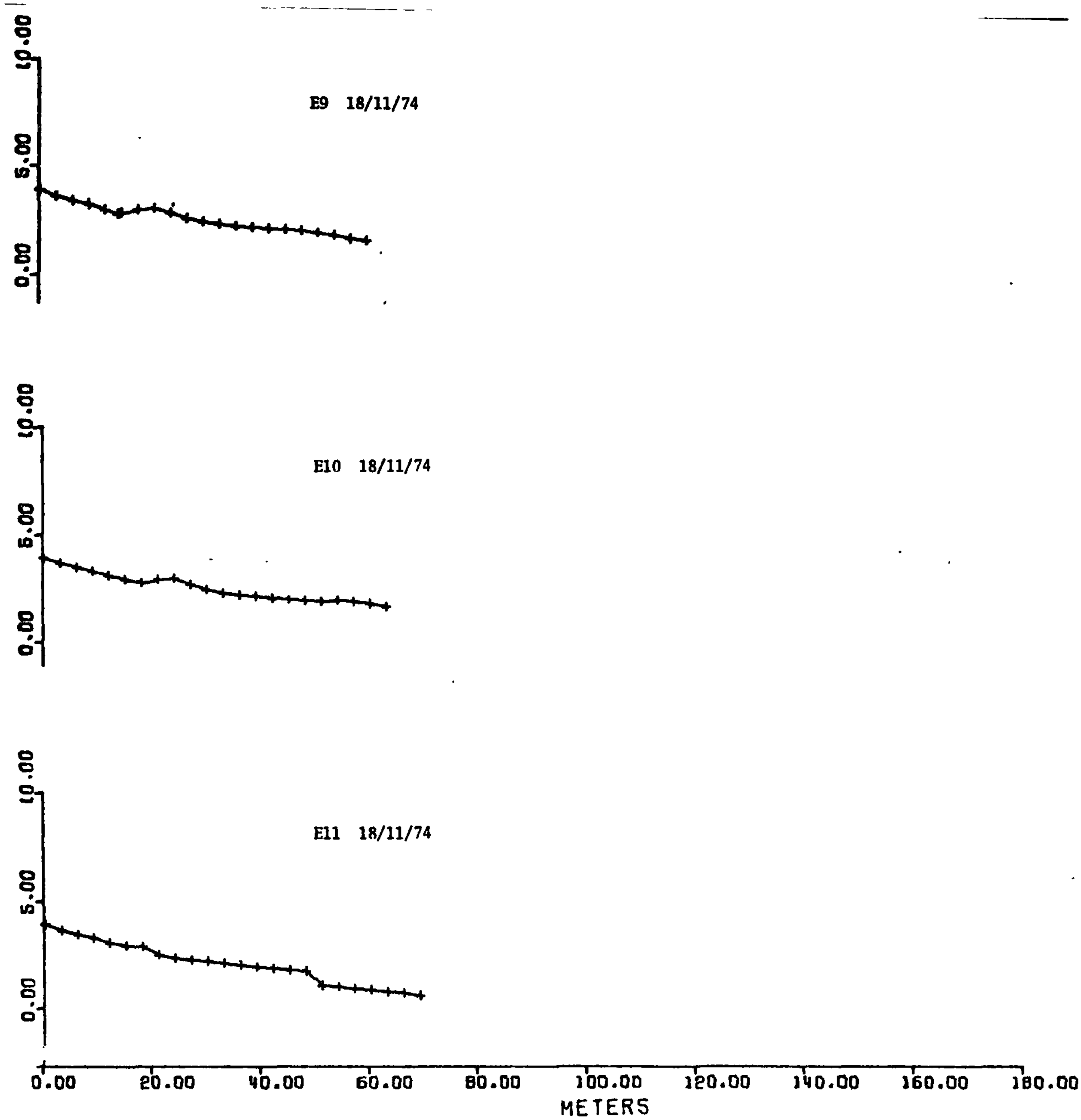
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E9 18/11/74
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E11 18/11/74
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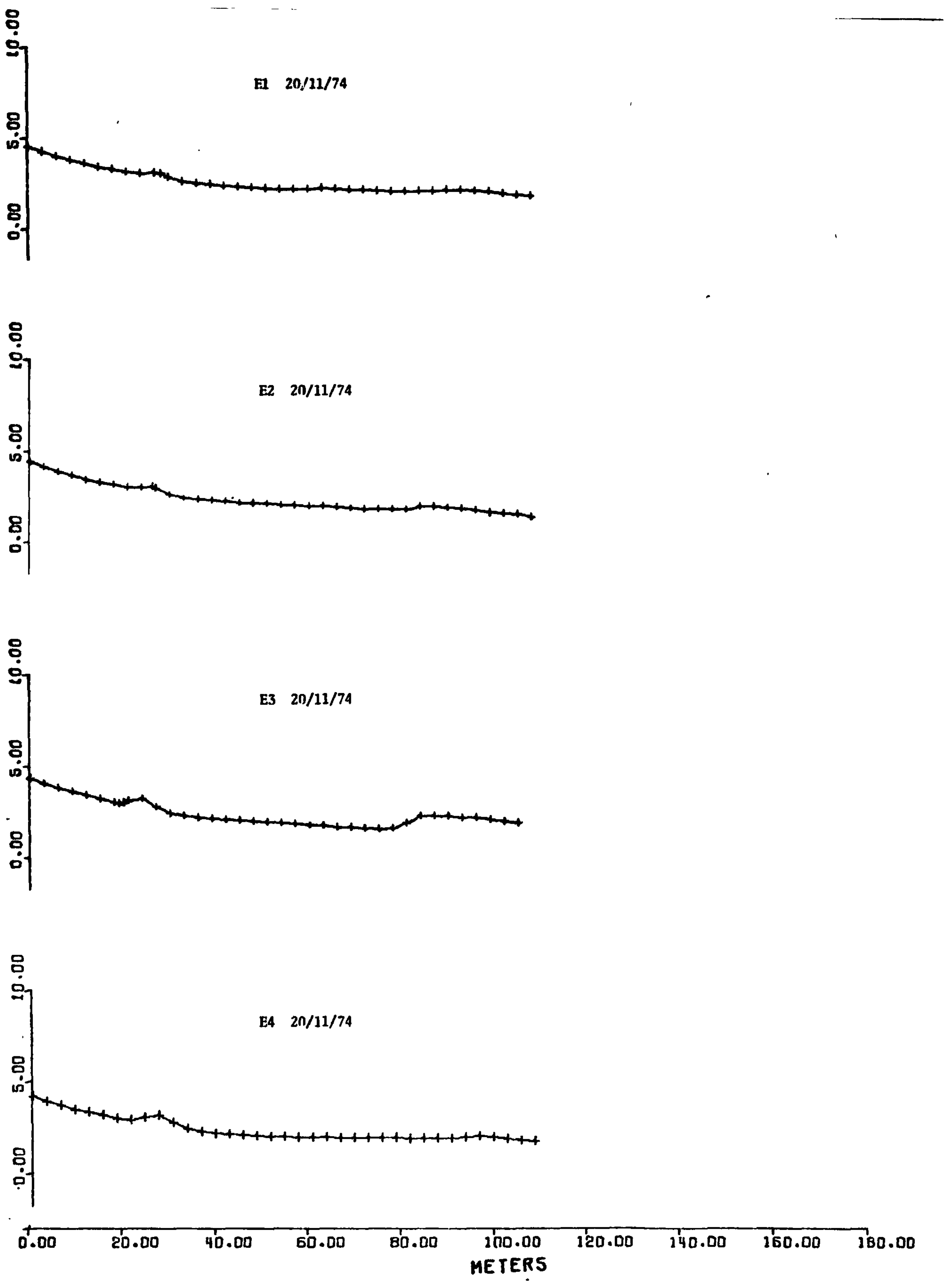
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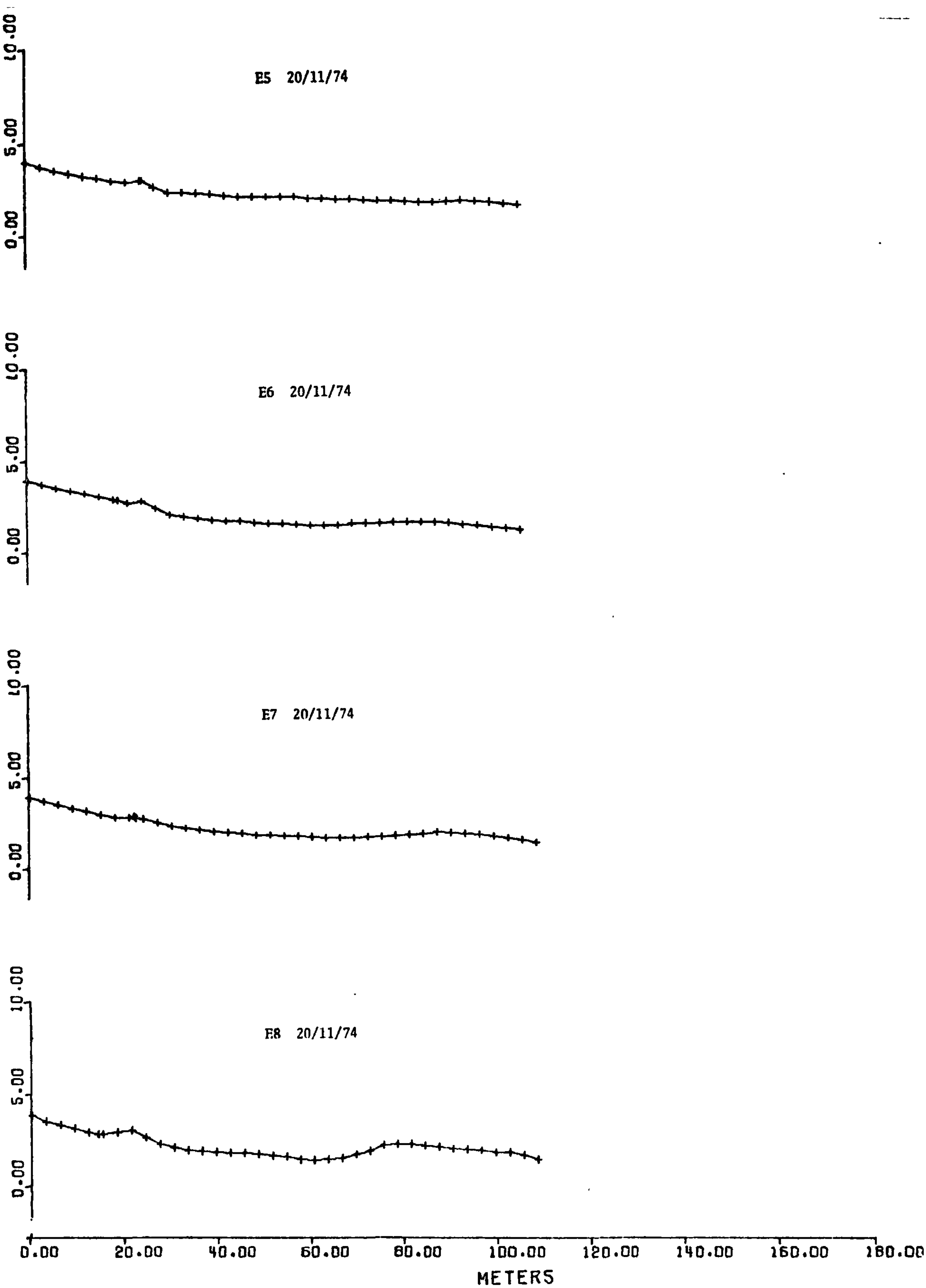
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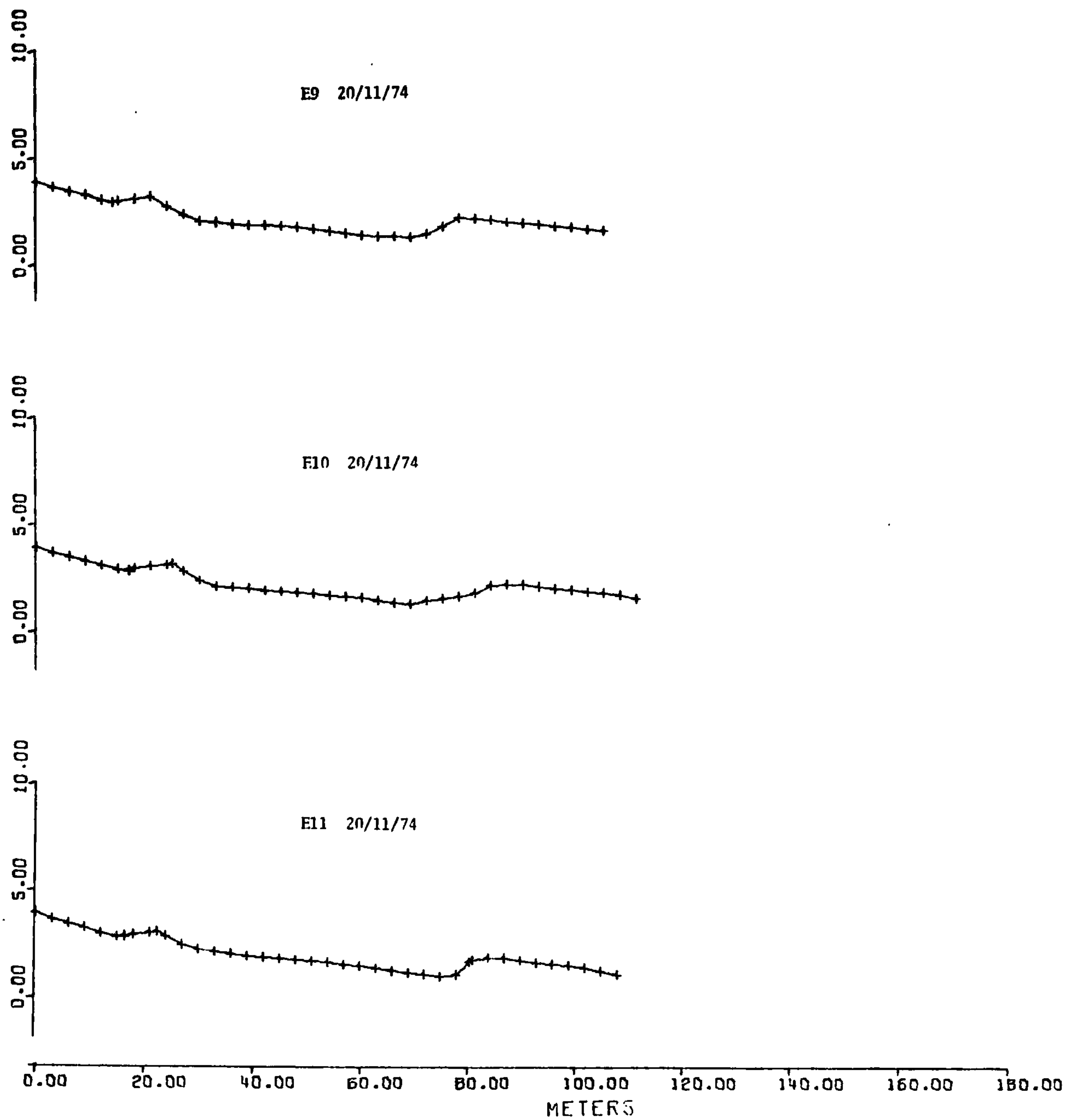
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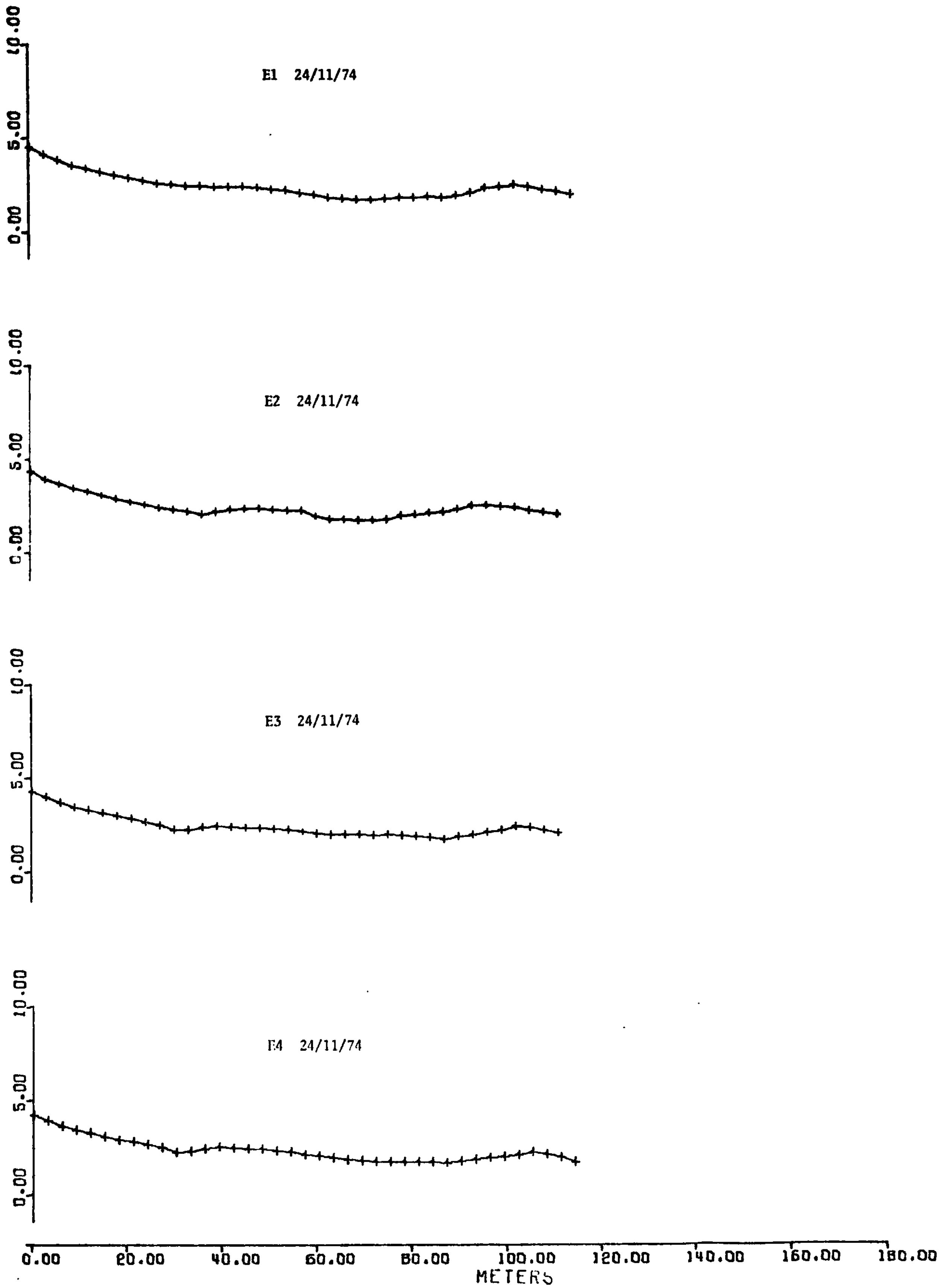
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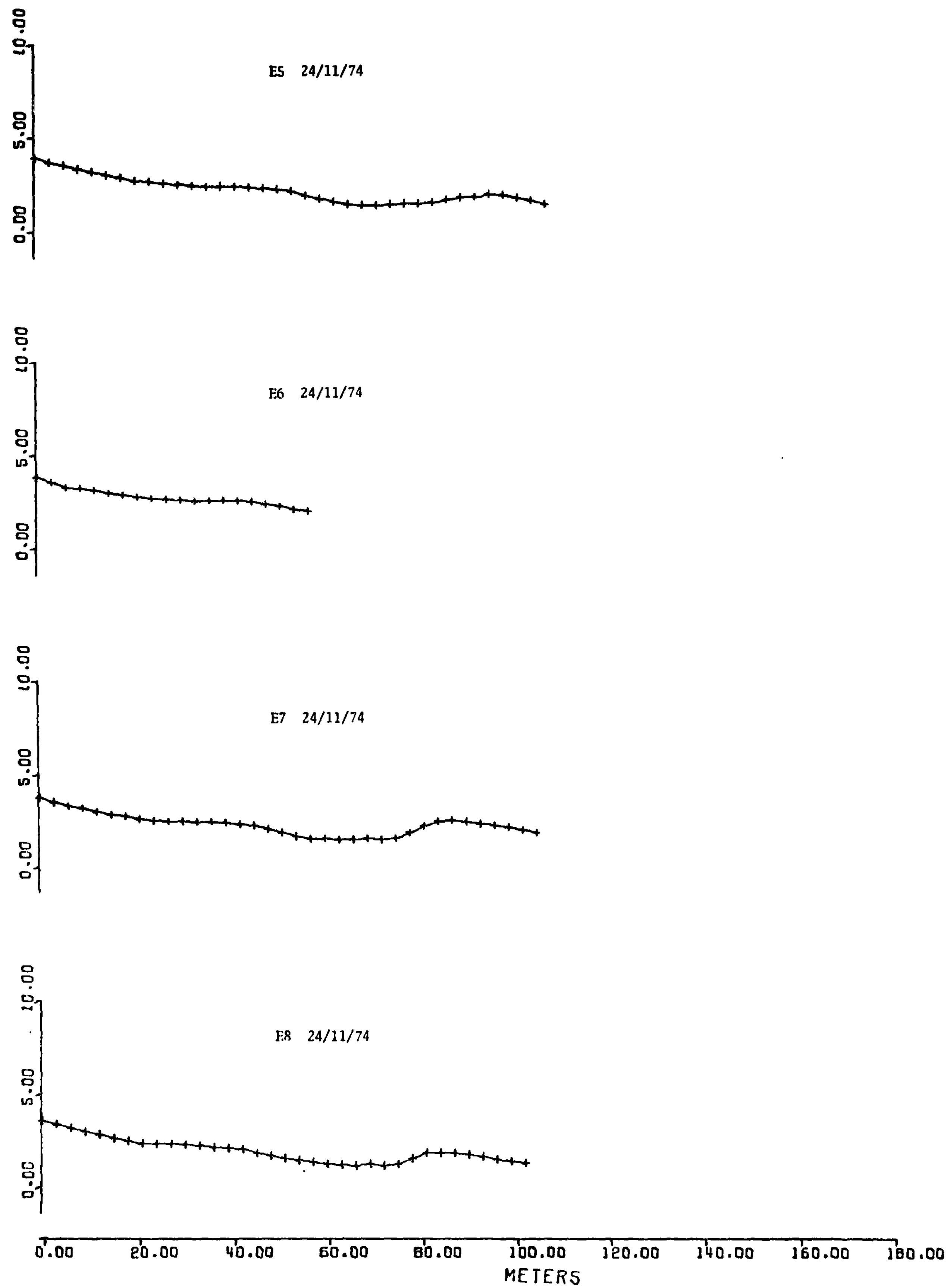
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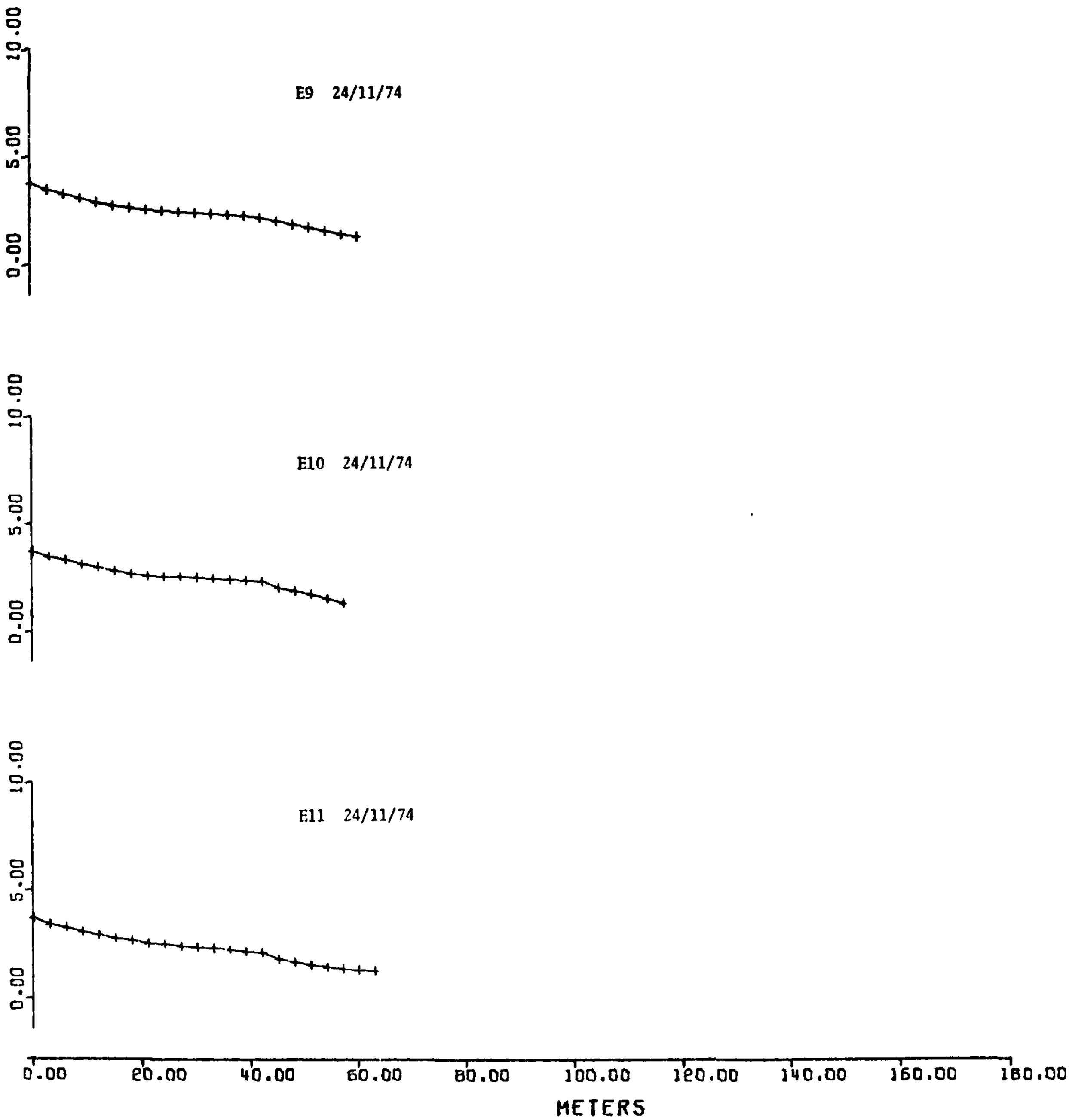
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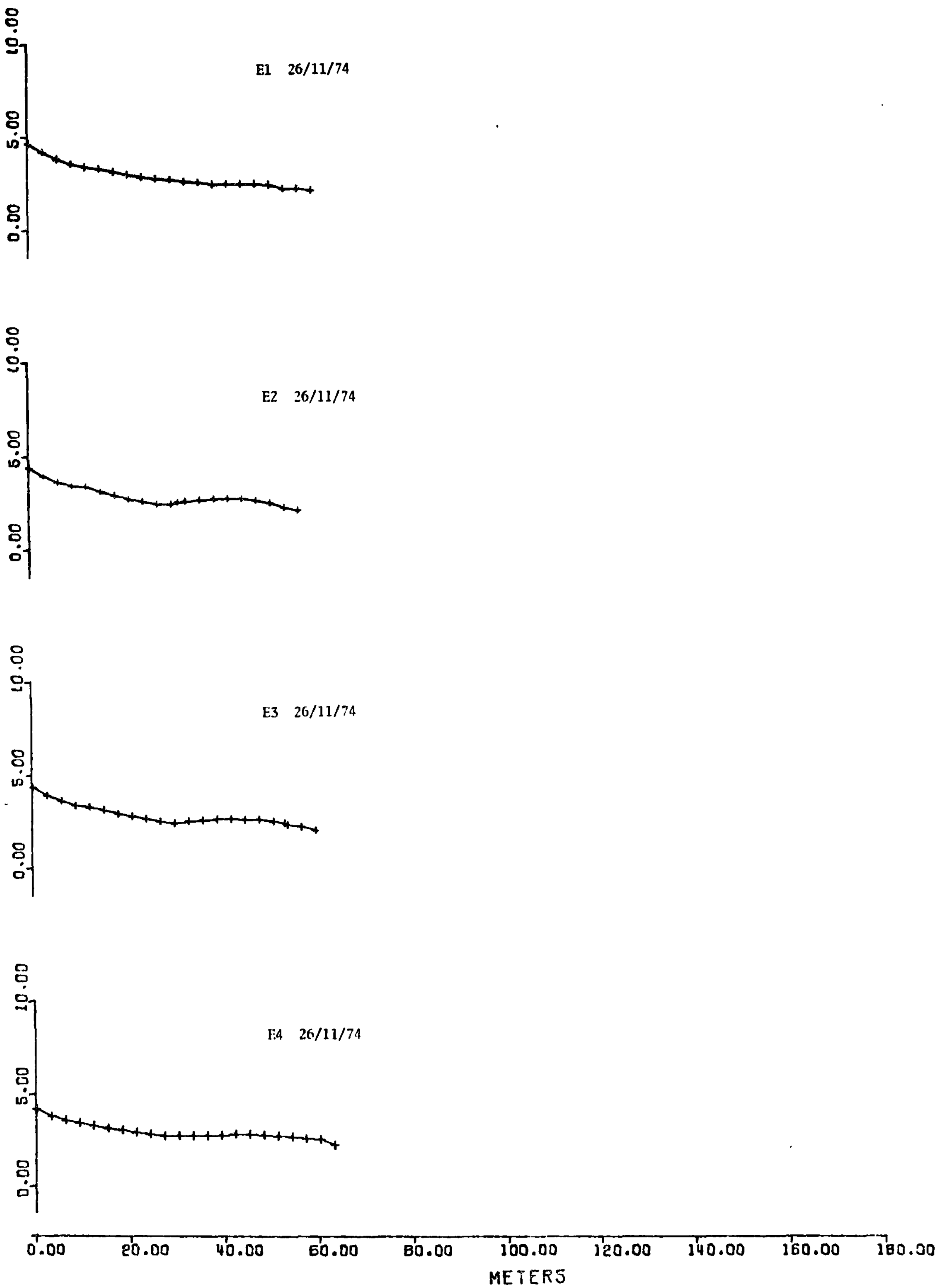
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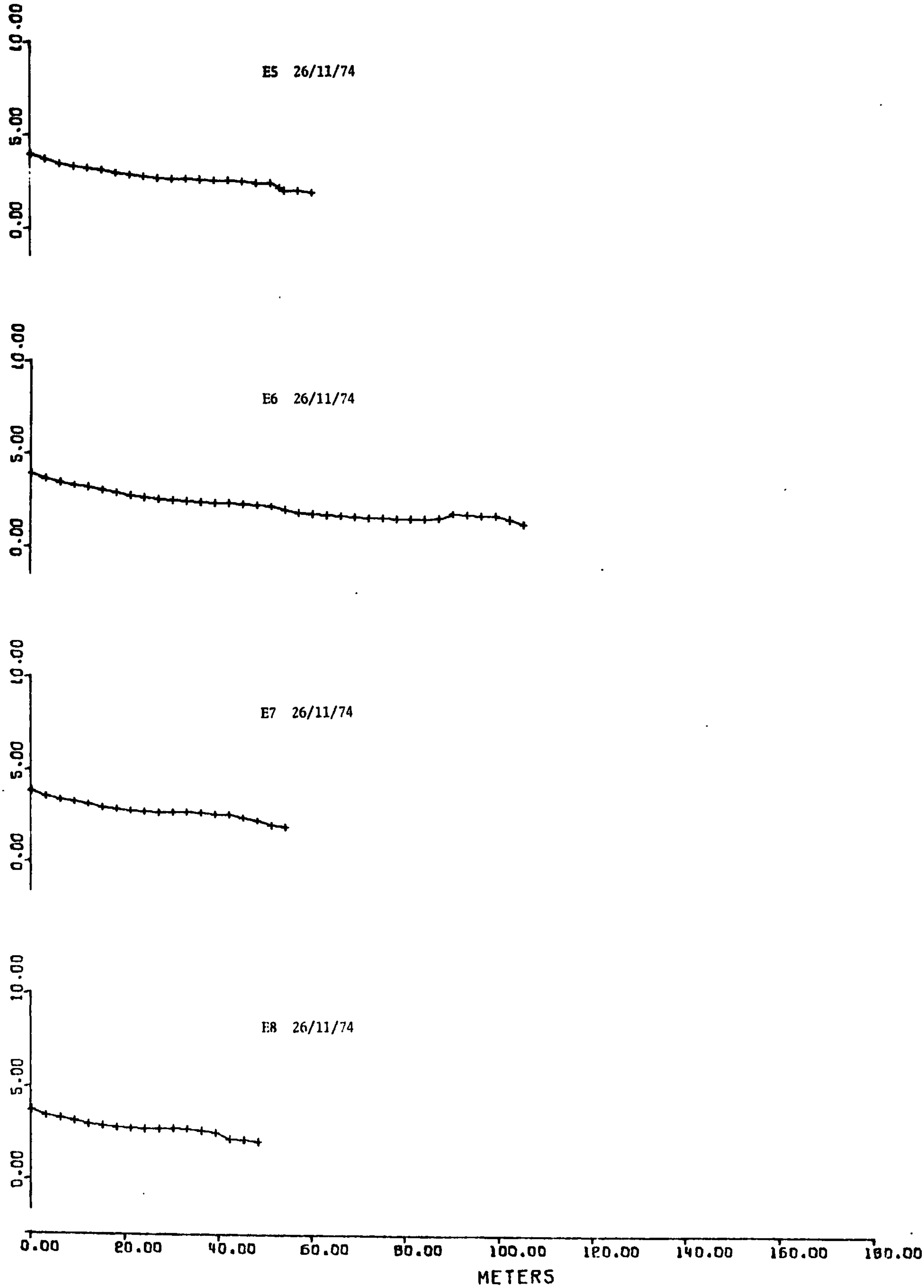
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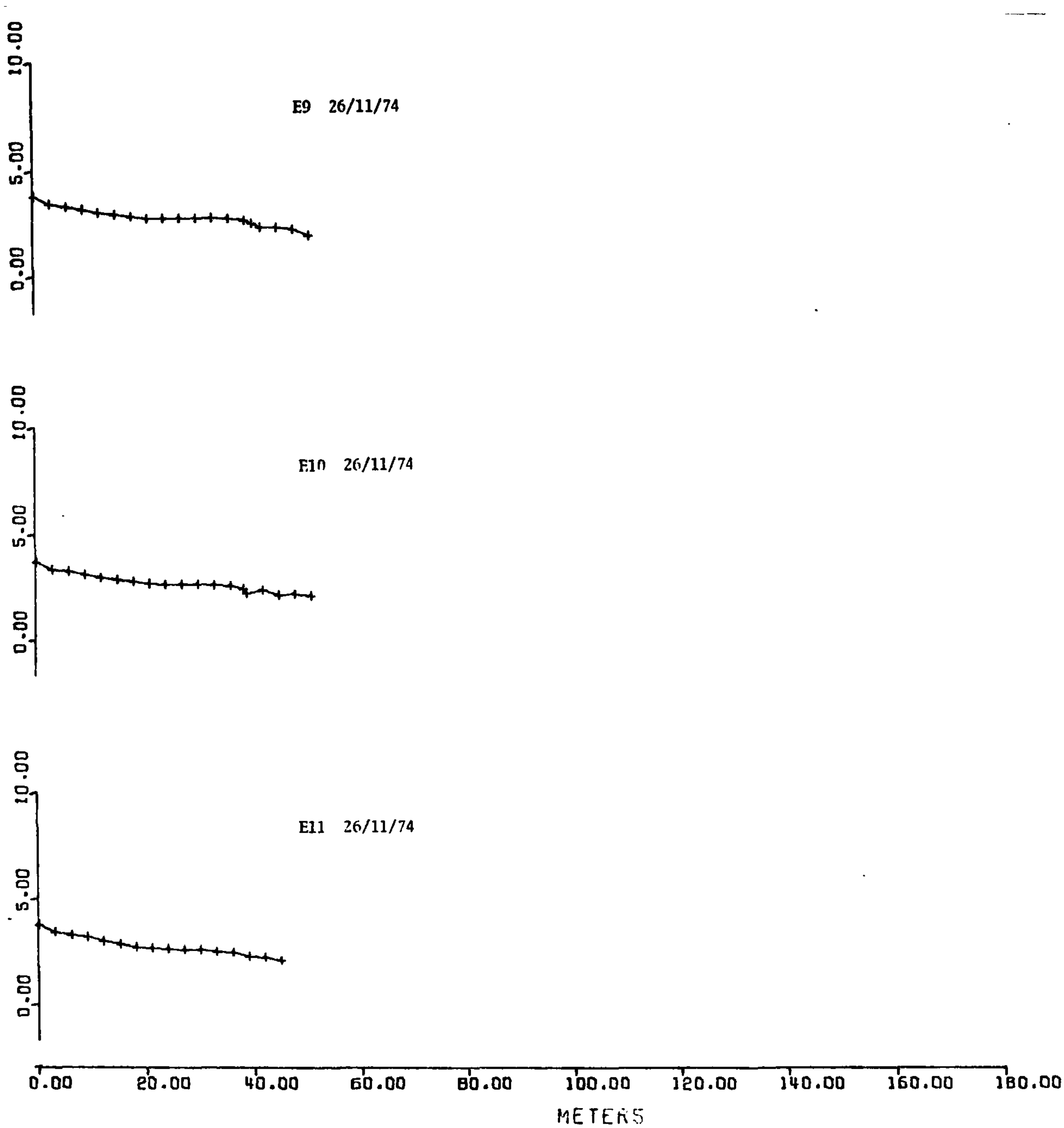
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120.00
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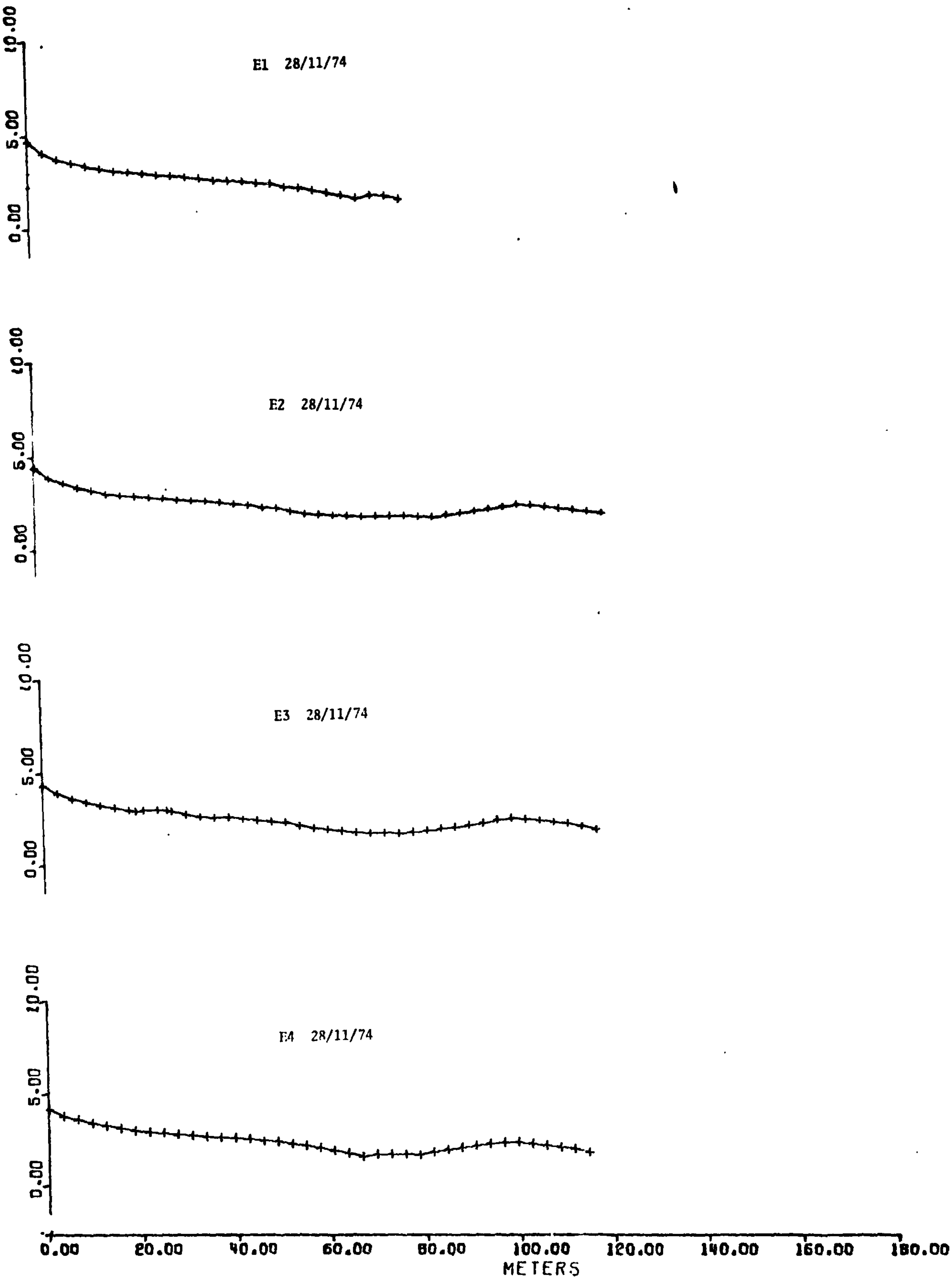
METERS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E3 28/11/74
10.00
5.00
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E4 28/11/74
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60.00
80.00
100.00
120.00
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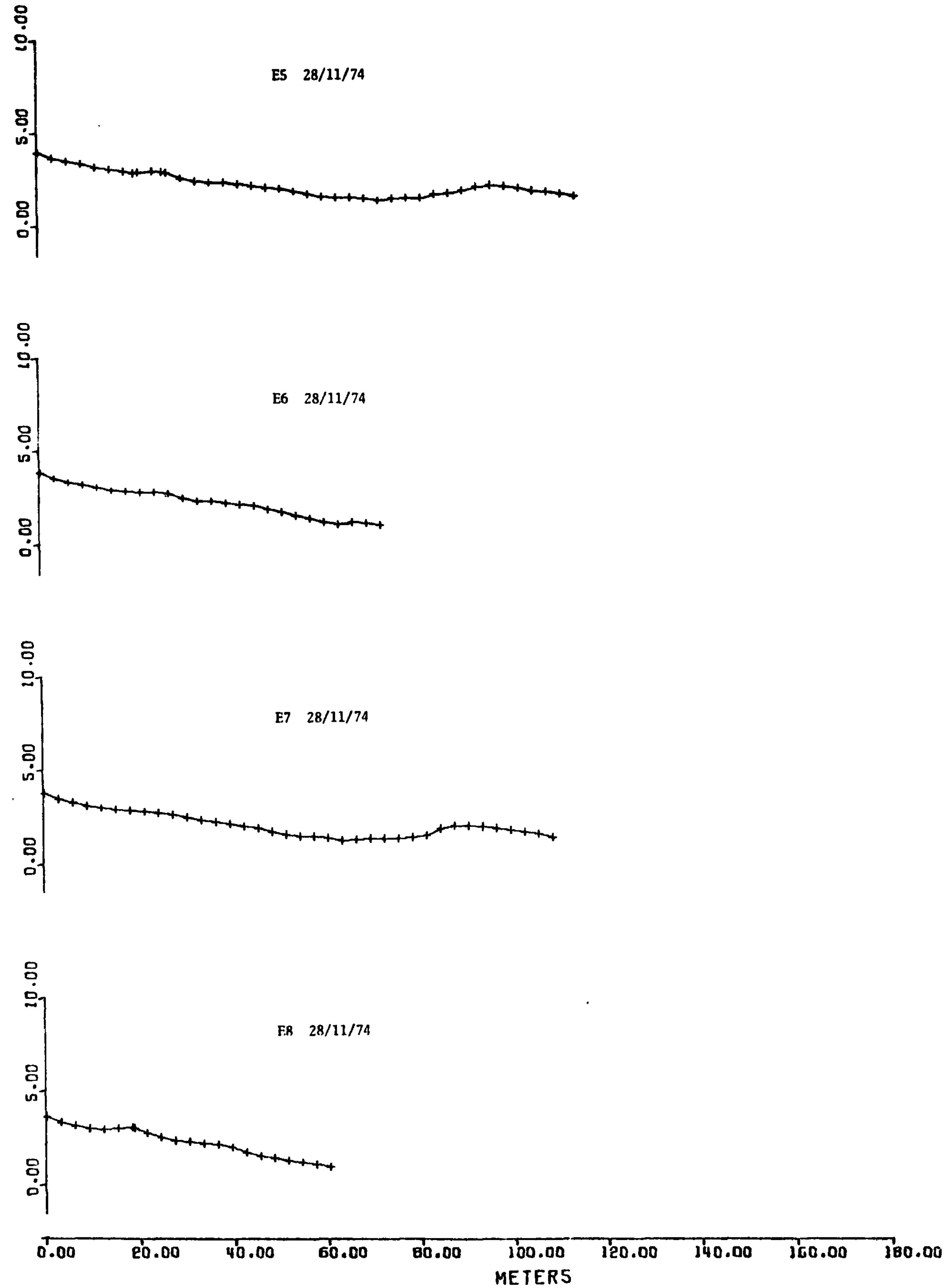
METERS



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E6 28/11/74
E7 28/11/74
E8 28/11/74
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120.00
140.00
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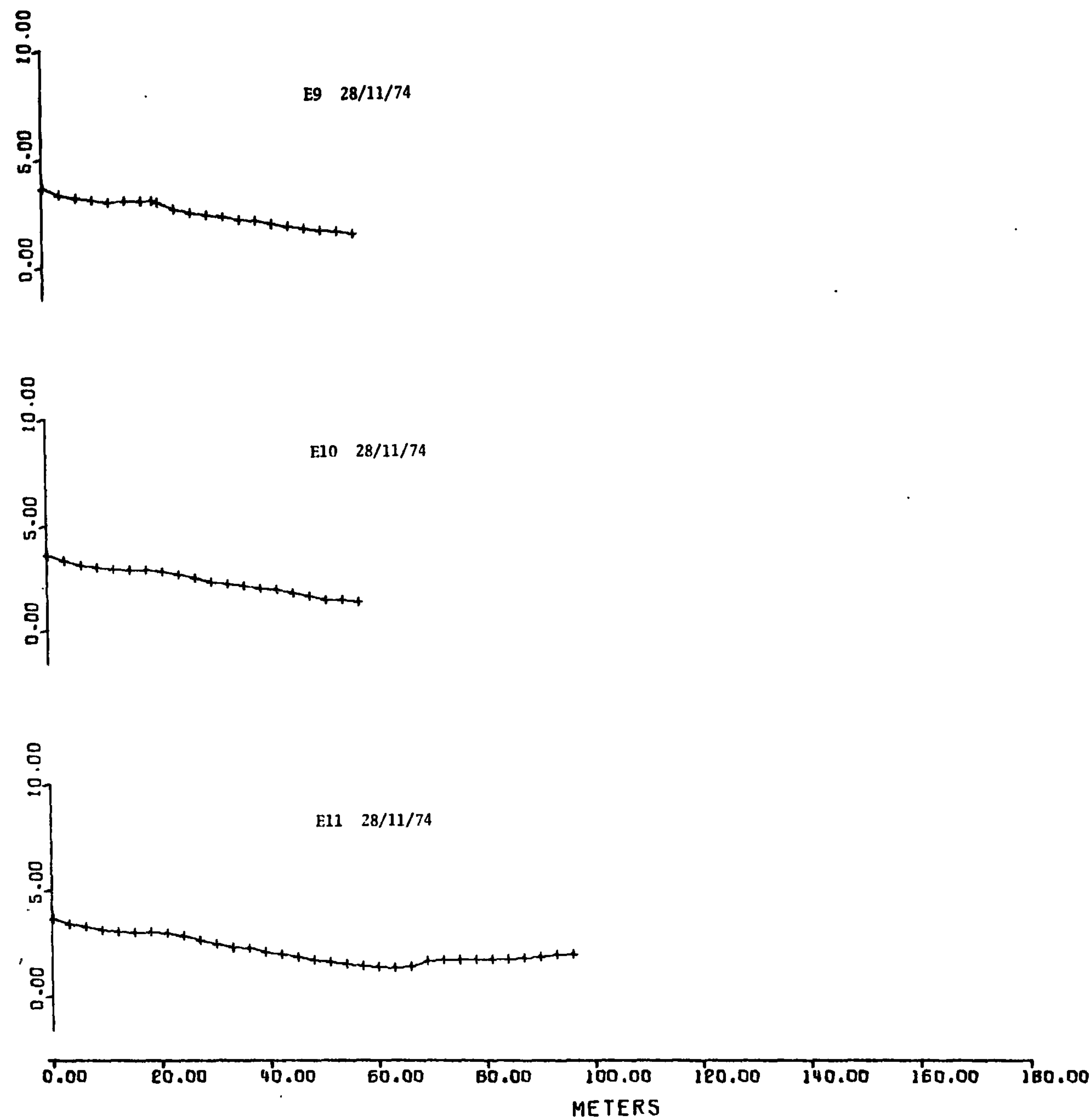
METERS



E9 28/11/74
E10 28/11/74
E11 28/11/74
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20.00
40.00
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80.00
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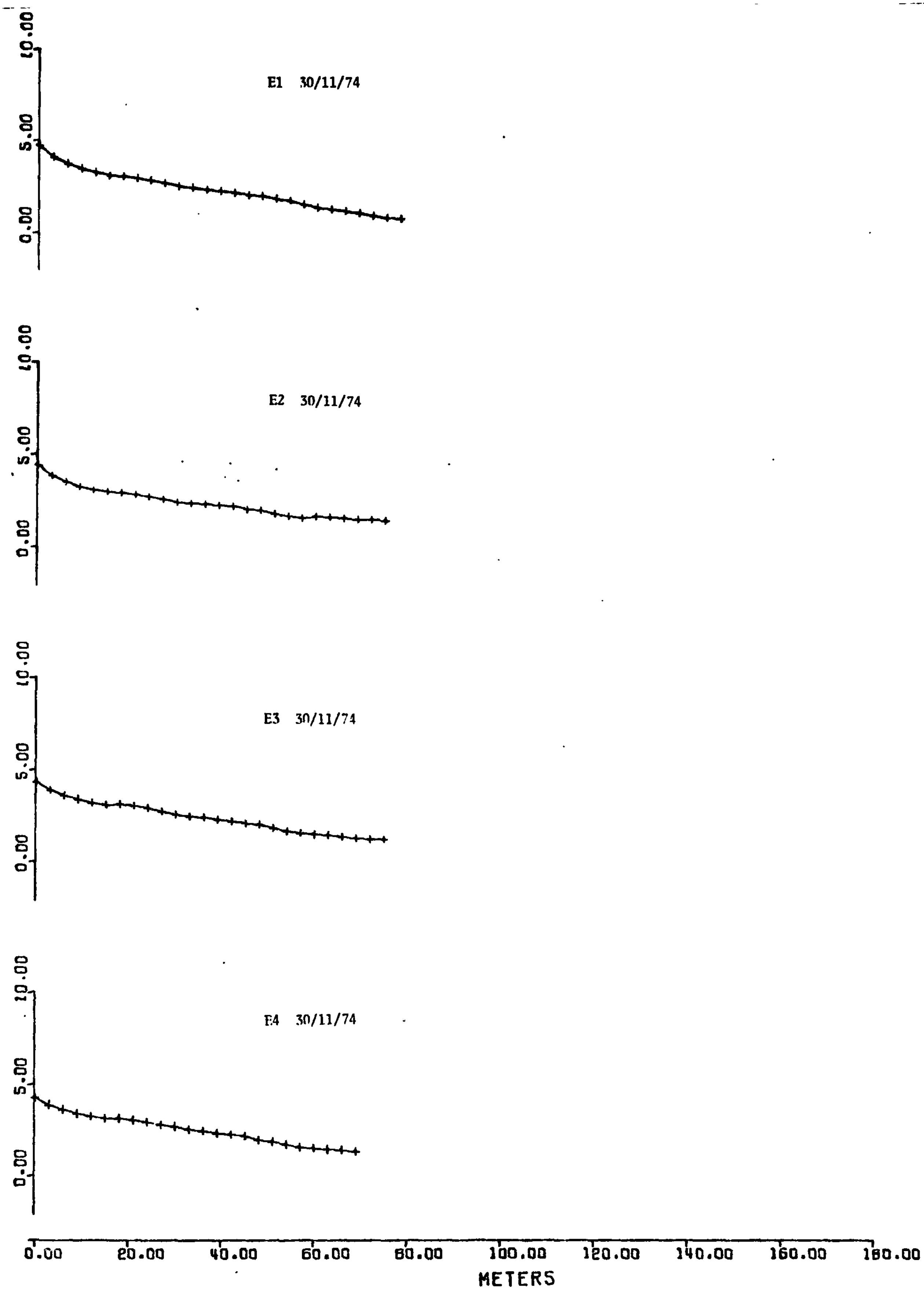
120.00
140.00
160.00
180.00
METERS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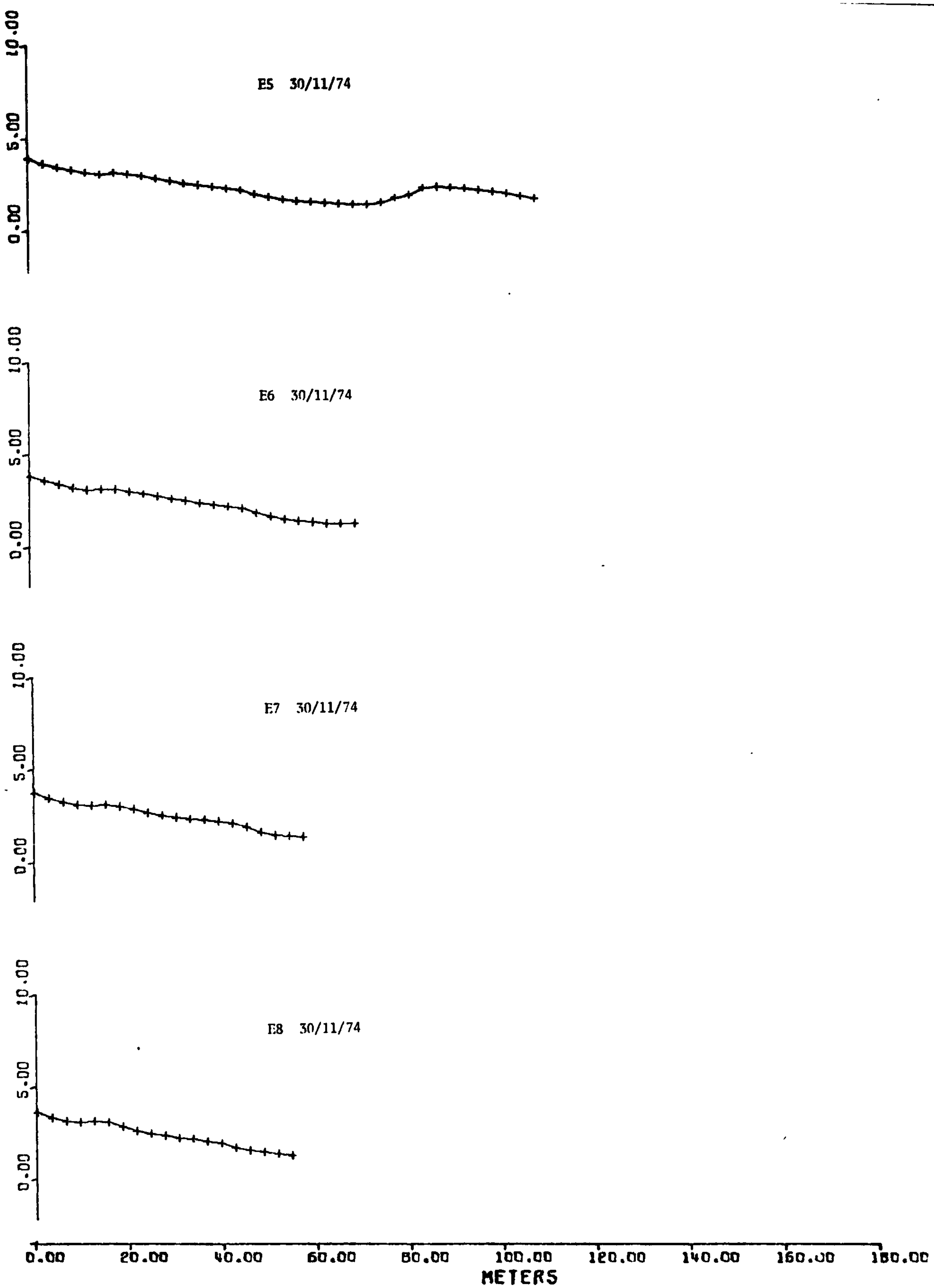
METERS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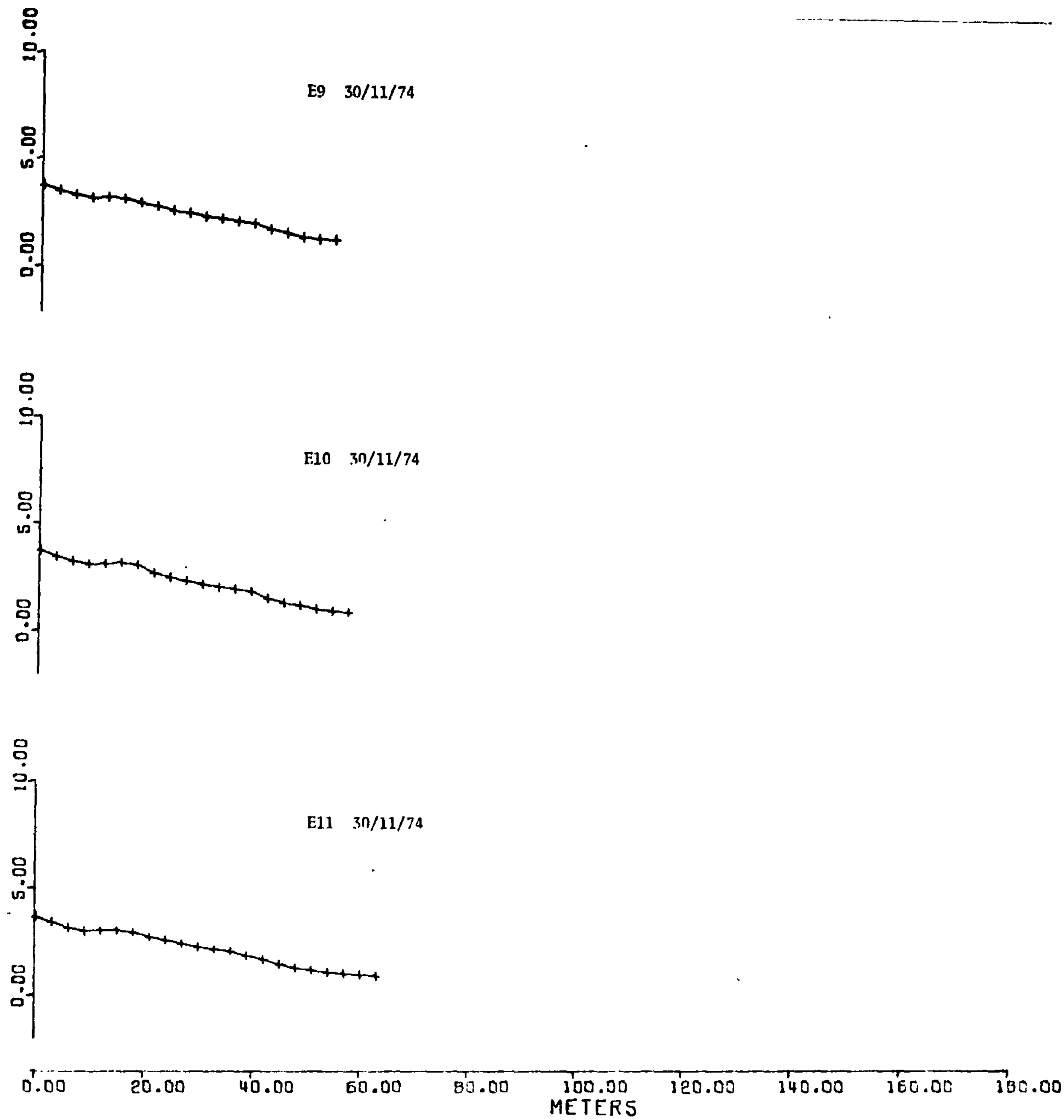
METERS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E10 30/11/74
E11 30/11/74
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5.00
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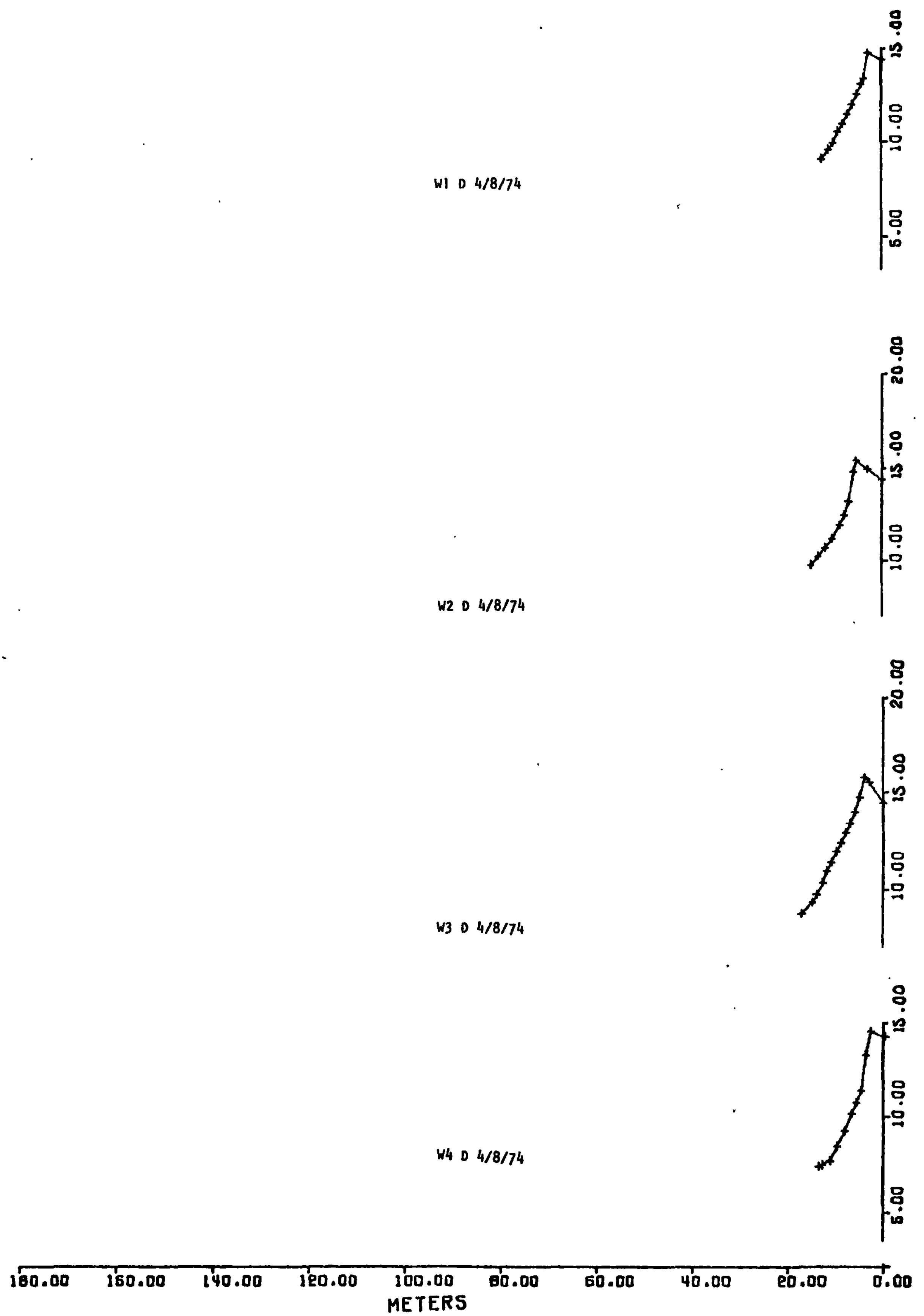
80.00
100.00
120.00
140.00
160.00
180.00
METERS

DUNE PROFILE PLOTS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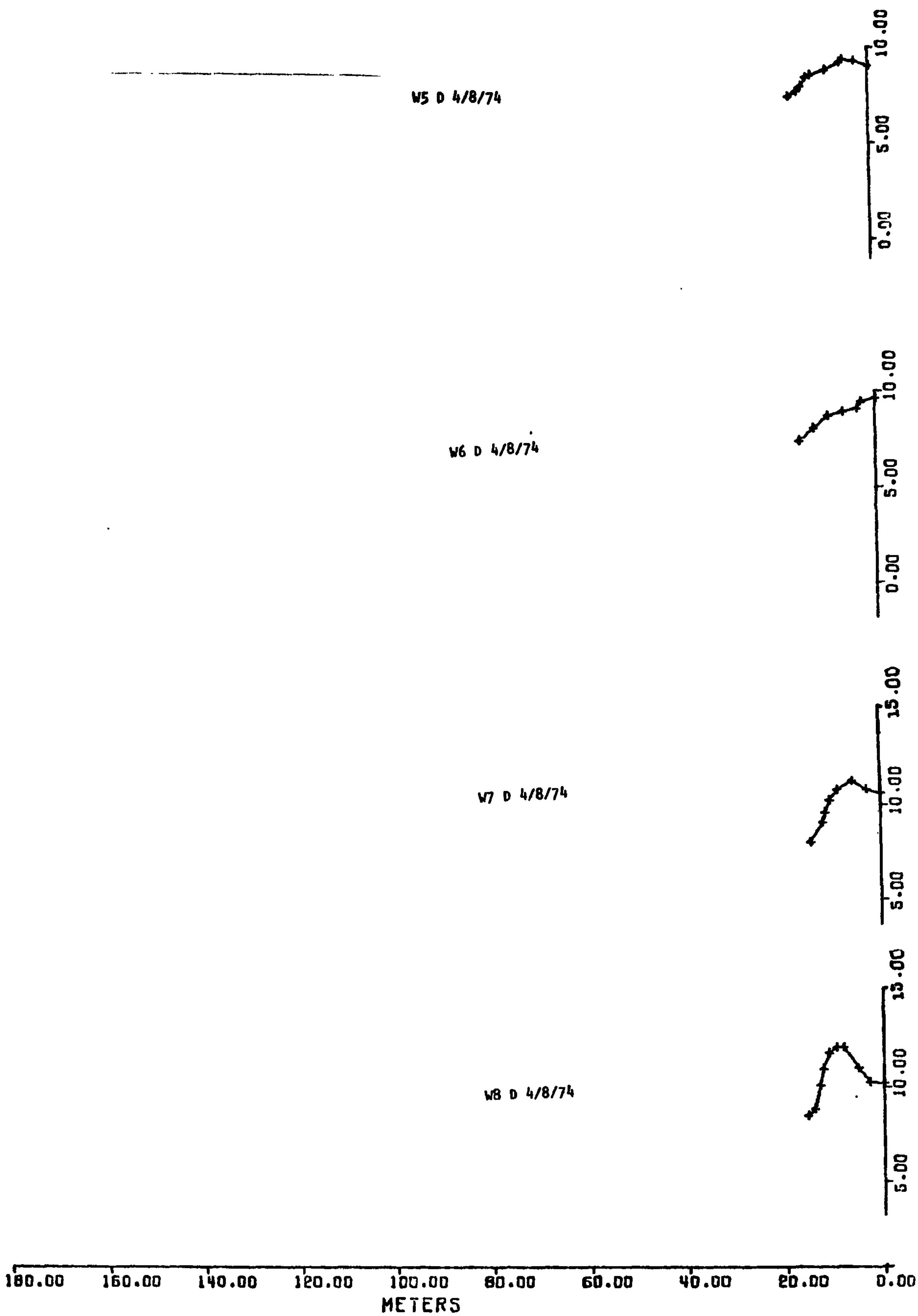
10.00
5.00
W1 D 4/8/74
20.00
15.00
10.00
W2 D 4/8/74
20.00
15.00
10.00
W3 D 4/8/74
15.00
10.00
5.00
W4 D 4/8/74
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
METERS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W6 D 4/8/74
W7 D 4/8/74
W8 D 4/8/74
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5.00
0.00
15.00
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140.00
120.00
100.00
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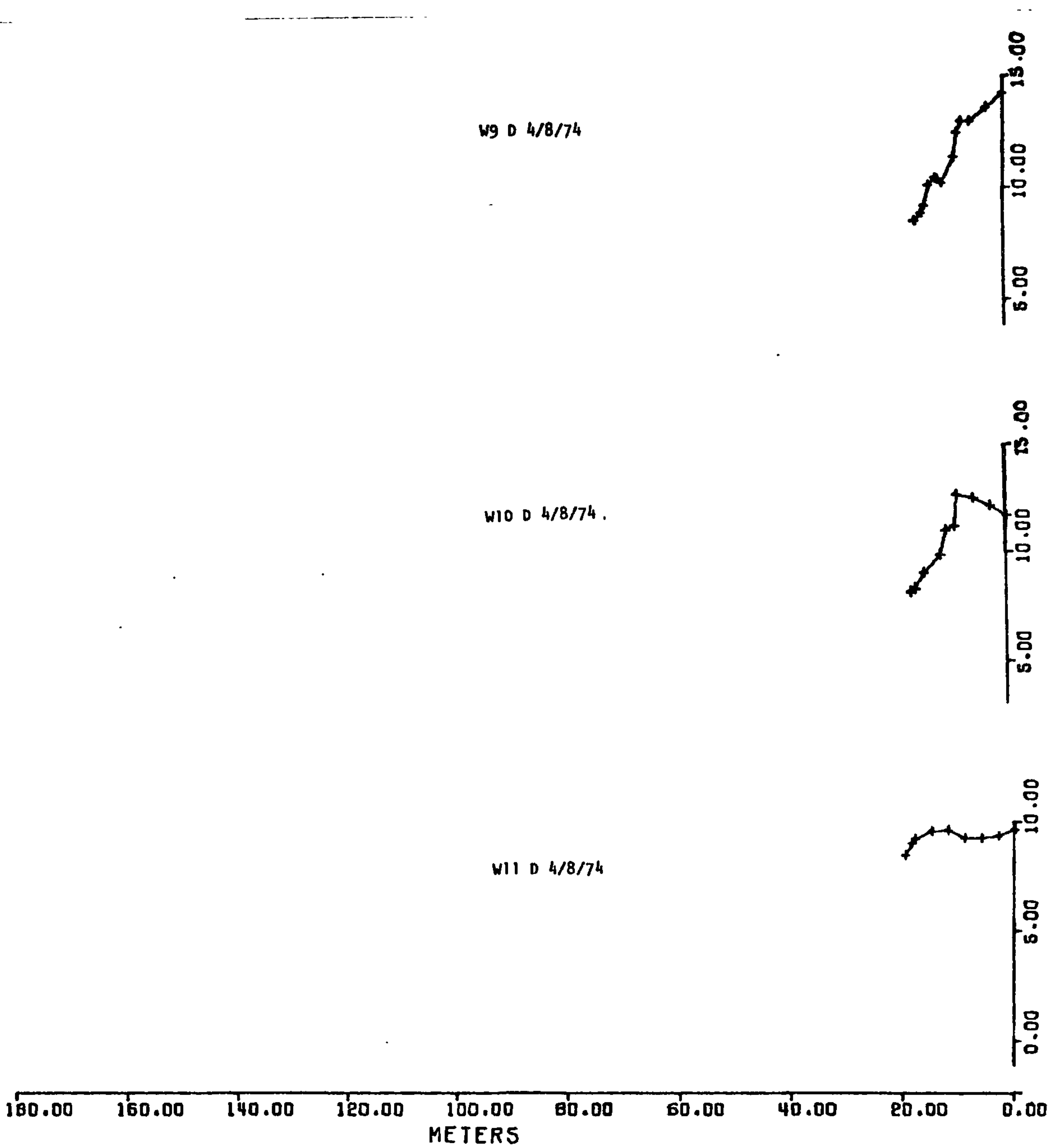
0.00
METERS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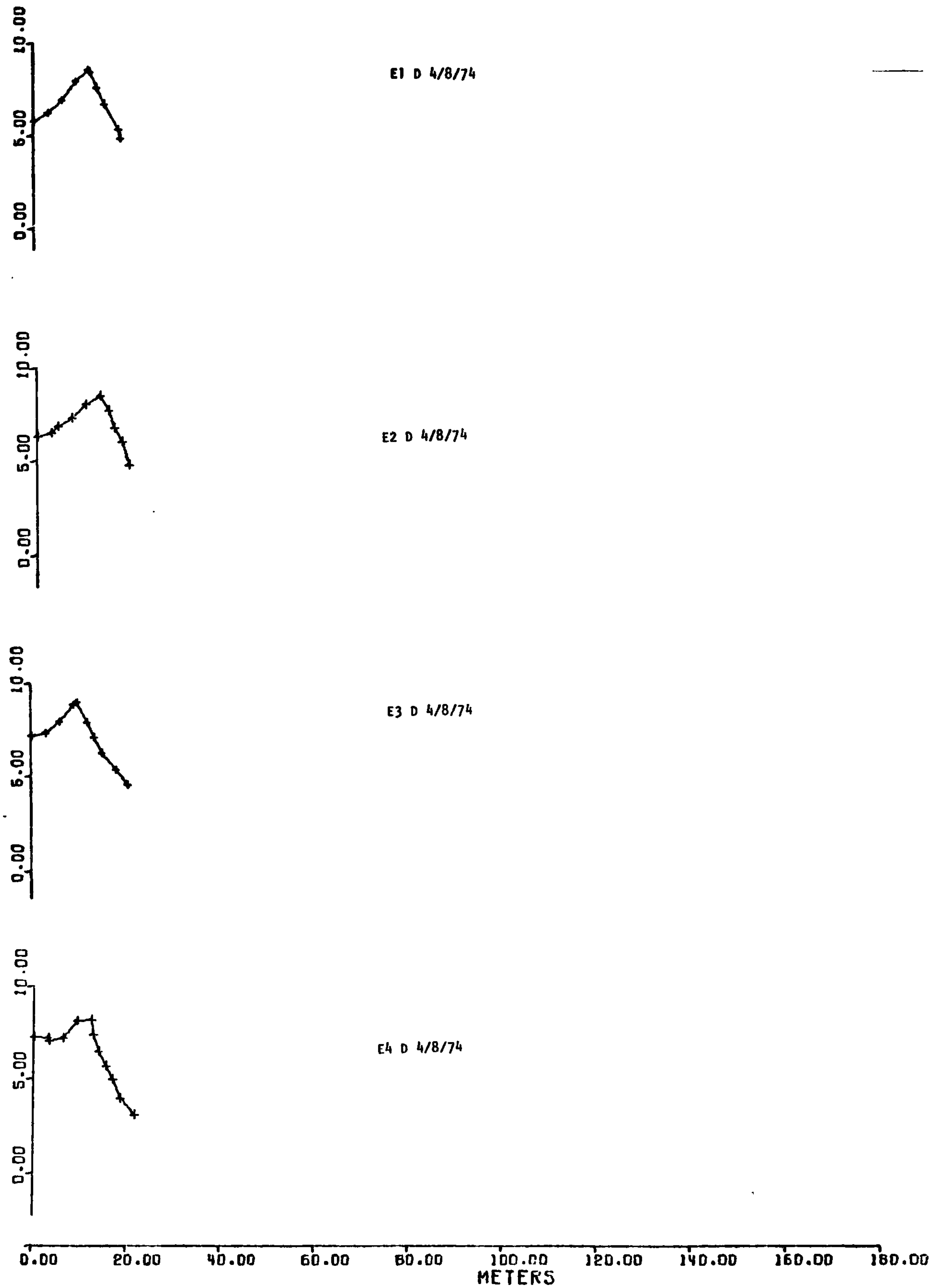
15.00
10.00
5.00
W10 D 4/8/74 .
15.00
10.00
5.00
W11 D 4/8/74
10.00
5.00
0.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
METERS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E3 D 4/8/74
E4 D 4/8/74
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5.00
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20.00
40.00
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80.00
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120.00
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160.00
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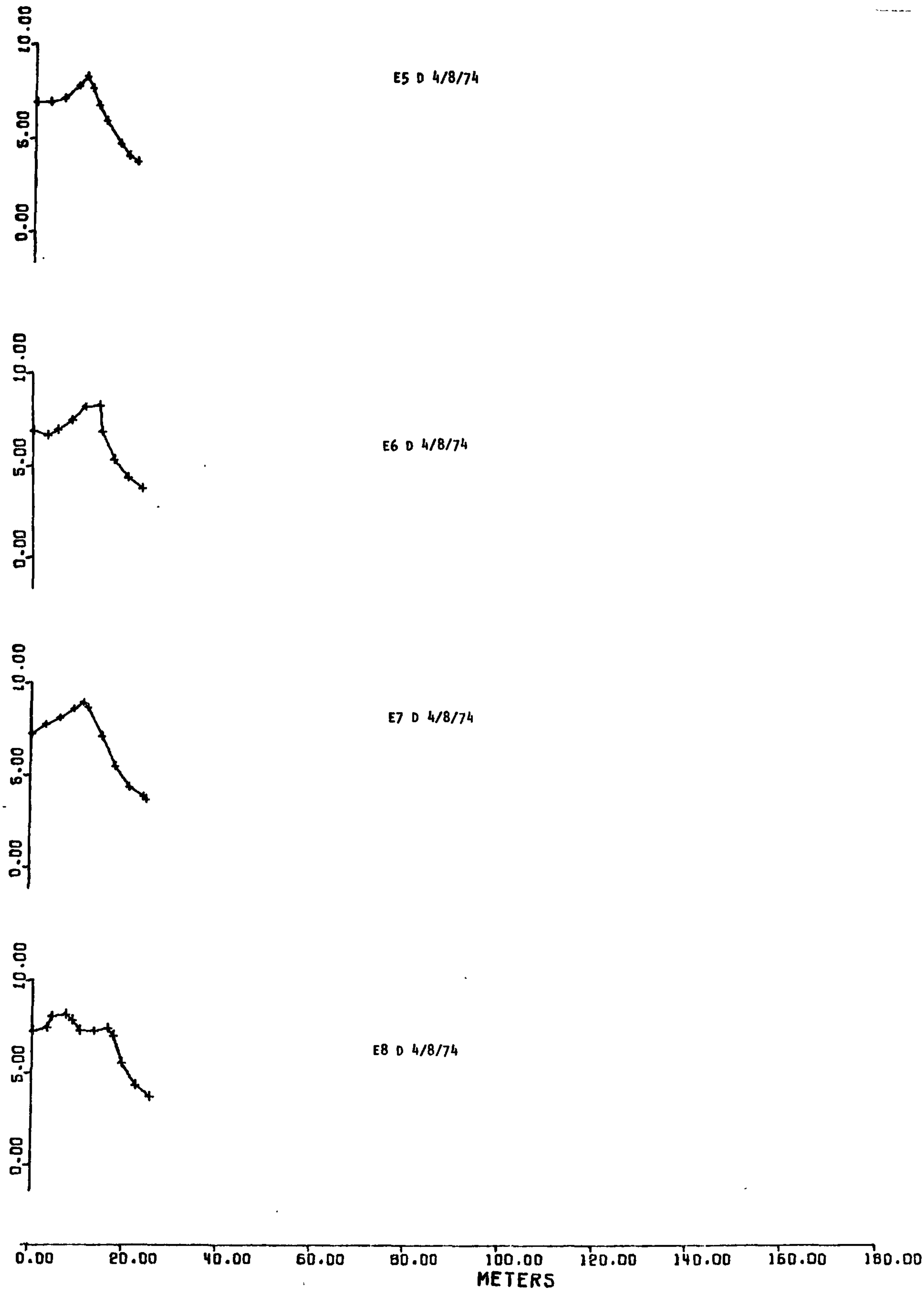
METERS


10.00
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E5 D 4/8/74
10.00
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E6 D 4/8/74
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E7 D 4/8/74
10.00
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E8 D 4/8/74
0.00
20.00
40.00
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80.00
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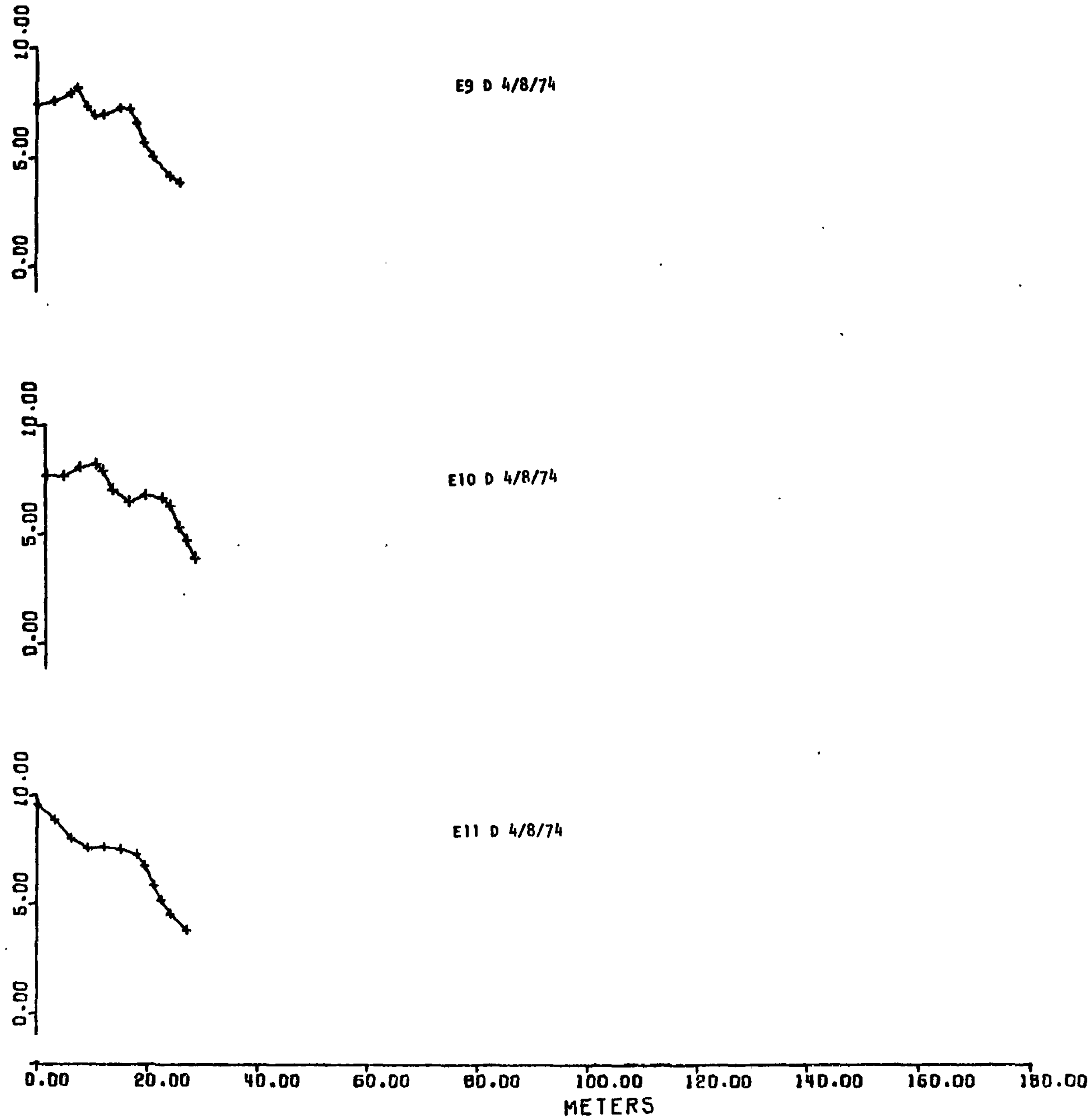
120.00
140.00
160.00
180.00
METERS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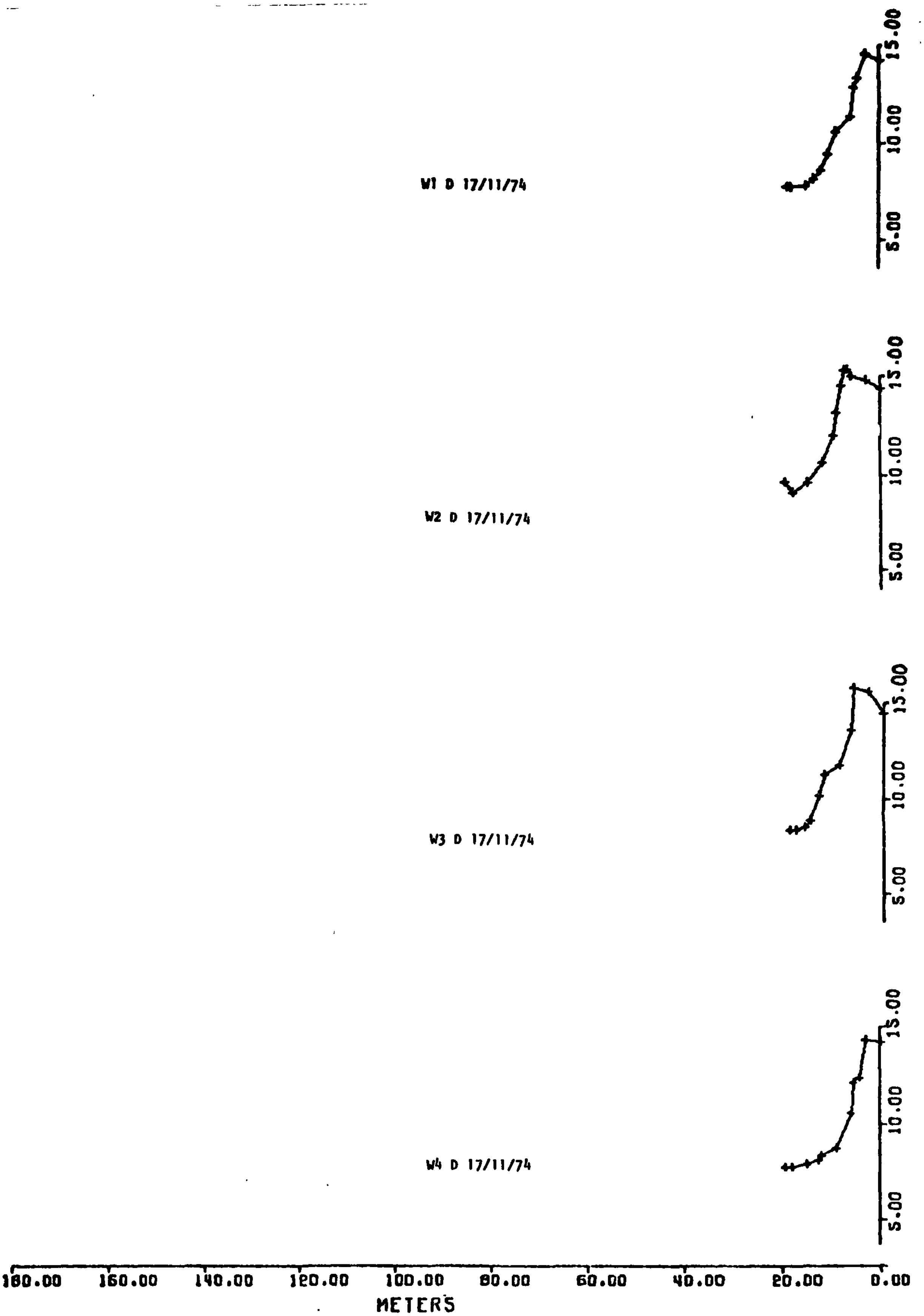
METERS



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W4 D 17/11/74
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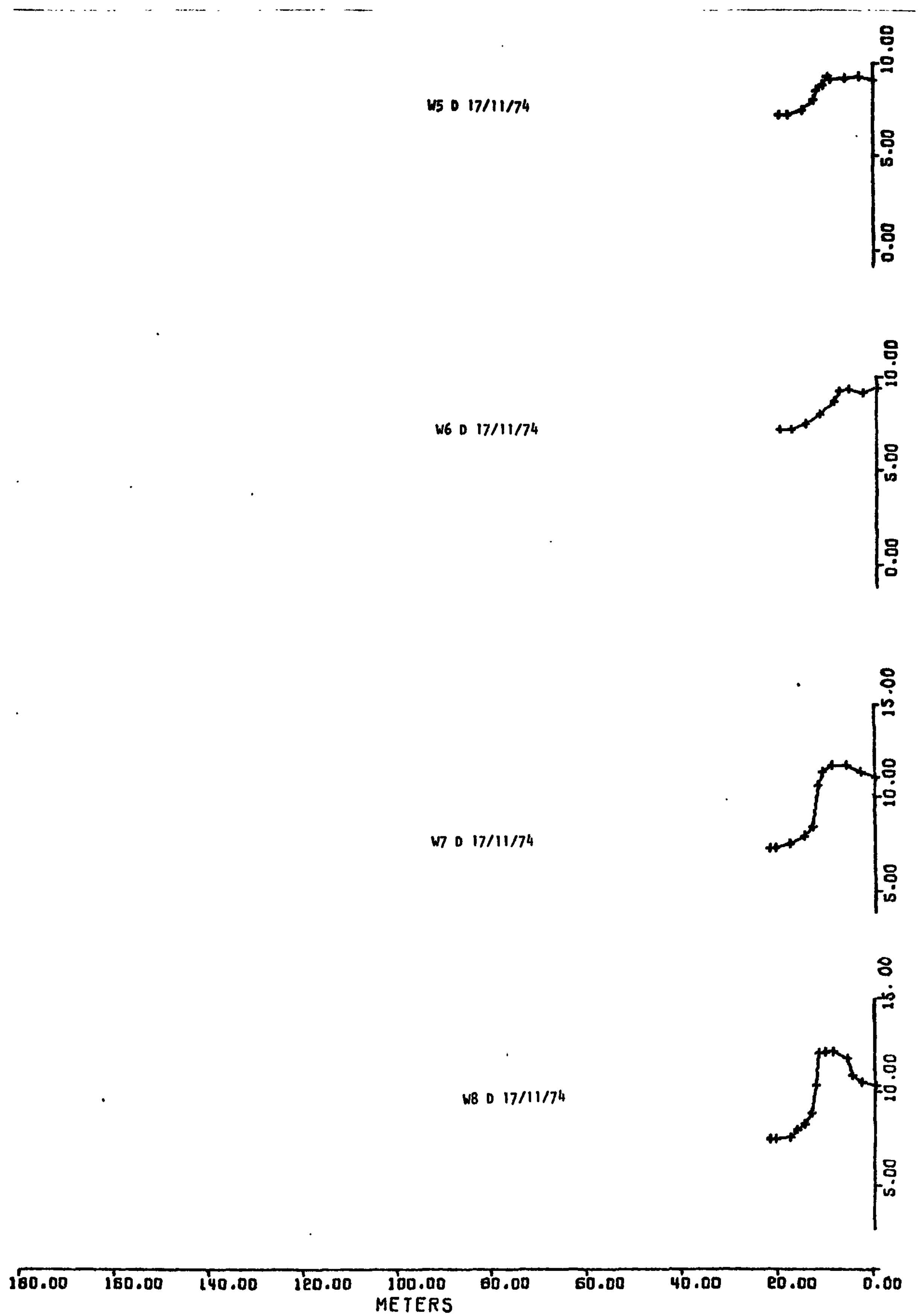
METERS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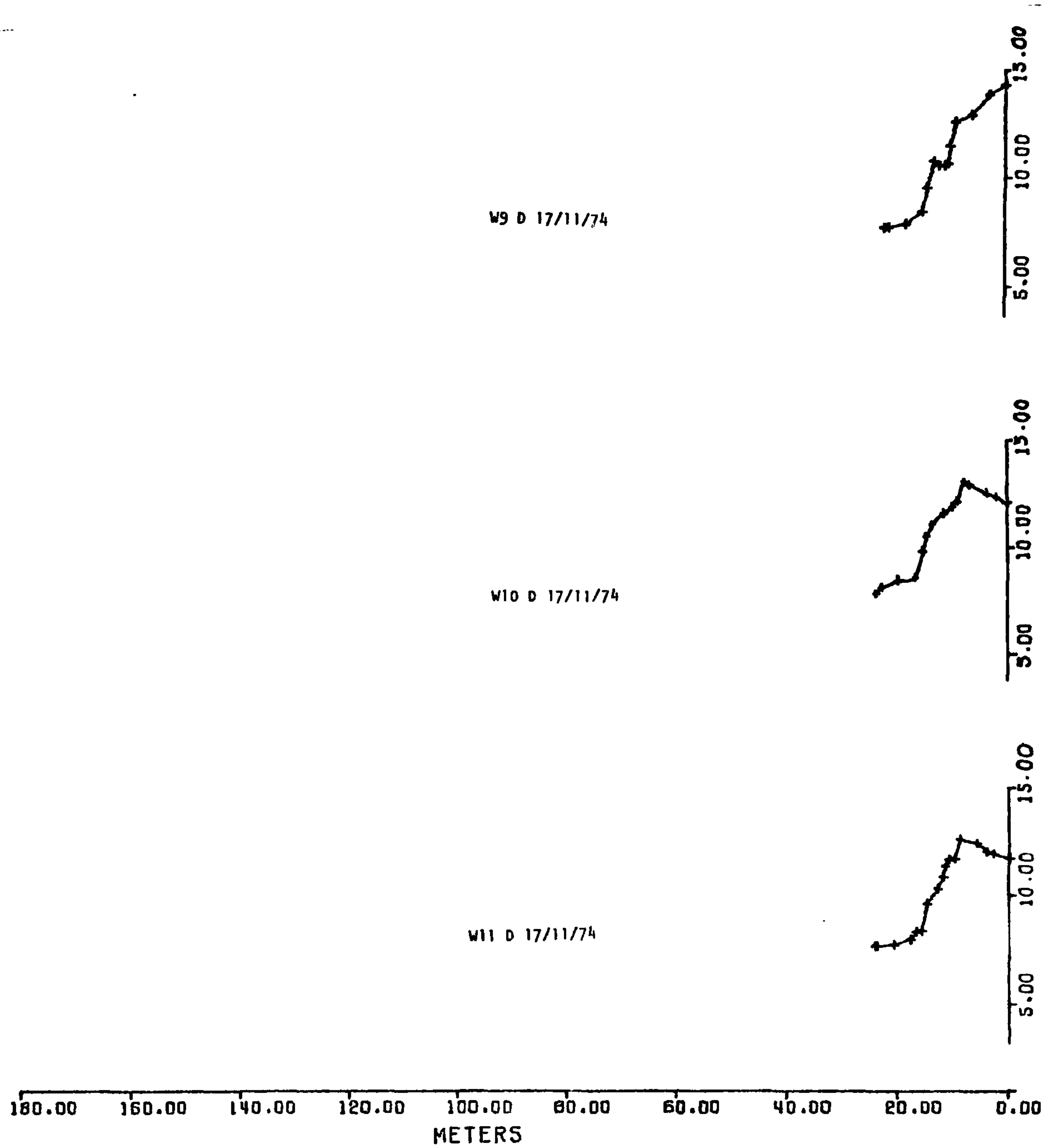
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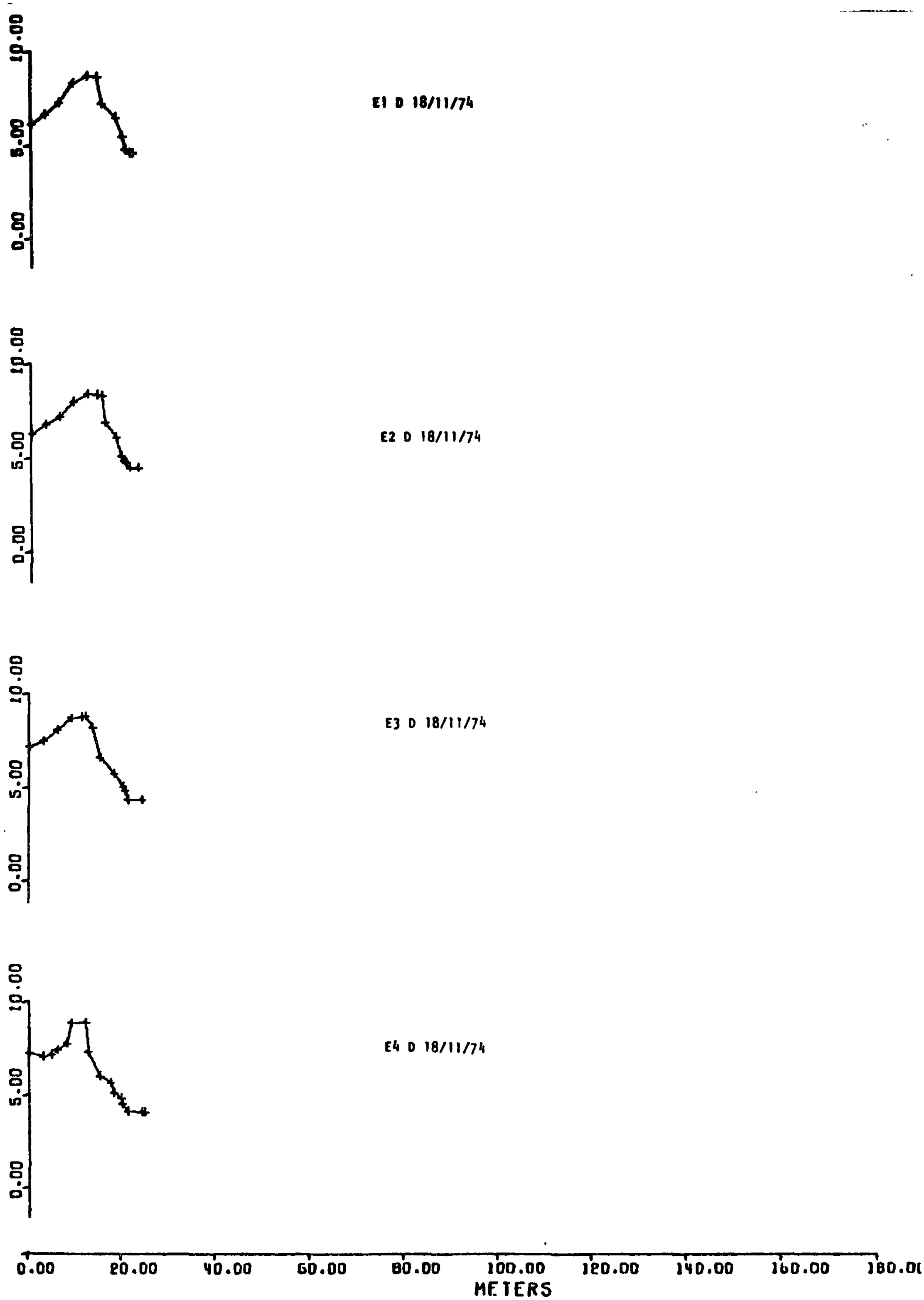
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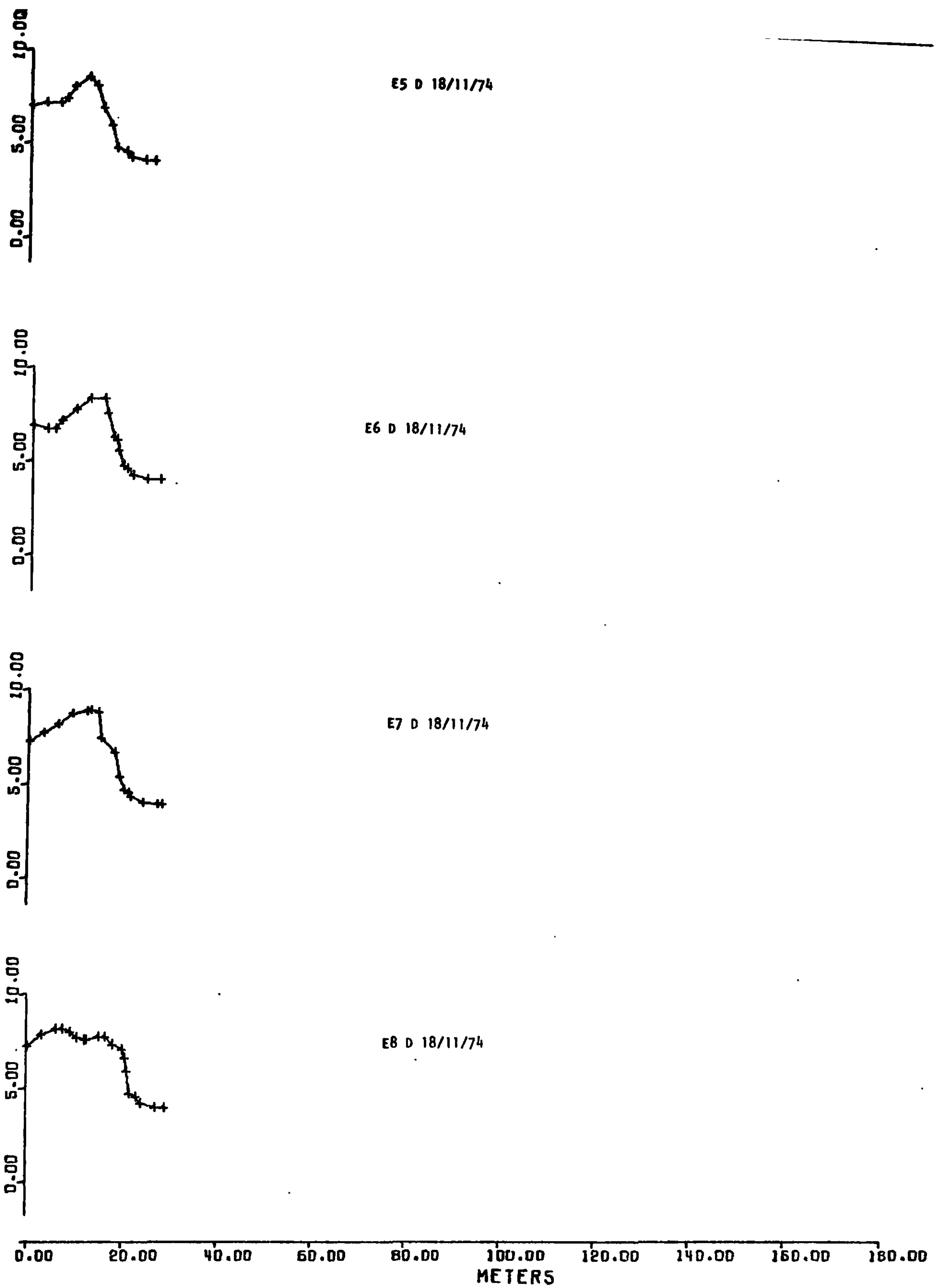
140.00
160.00
METERS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120.00
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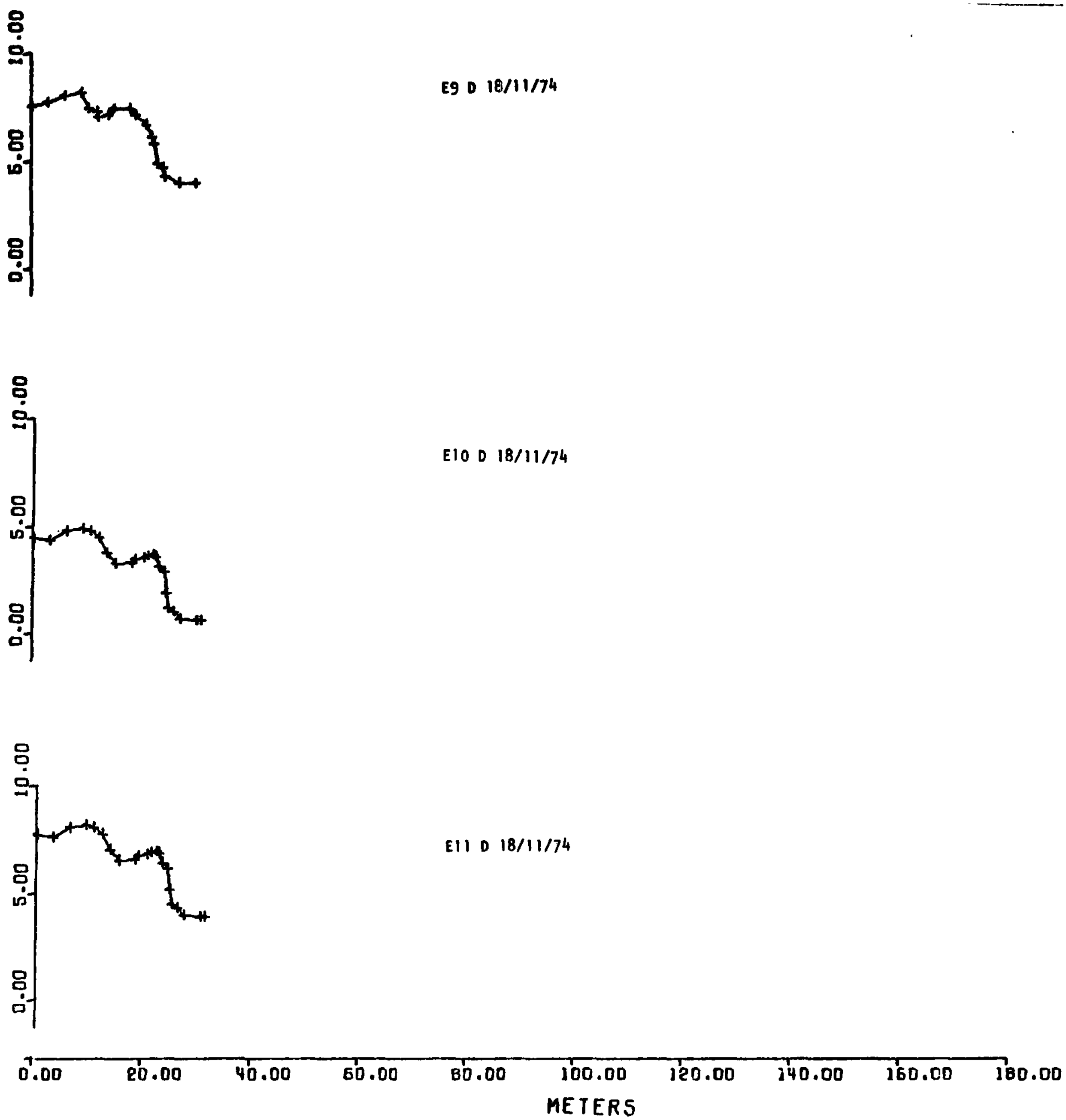
METERS


10.00
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E9 D 18/11/74
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E10 D 18/11/74
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E11 D 18/11/74
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40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
METERS

PART 6

NEARSHORE TOPOGRAPHY

CONTENTS

Survey Techniques:

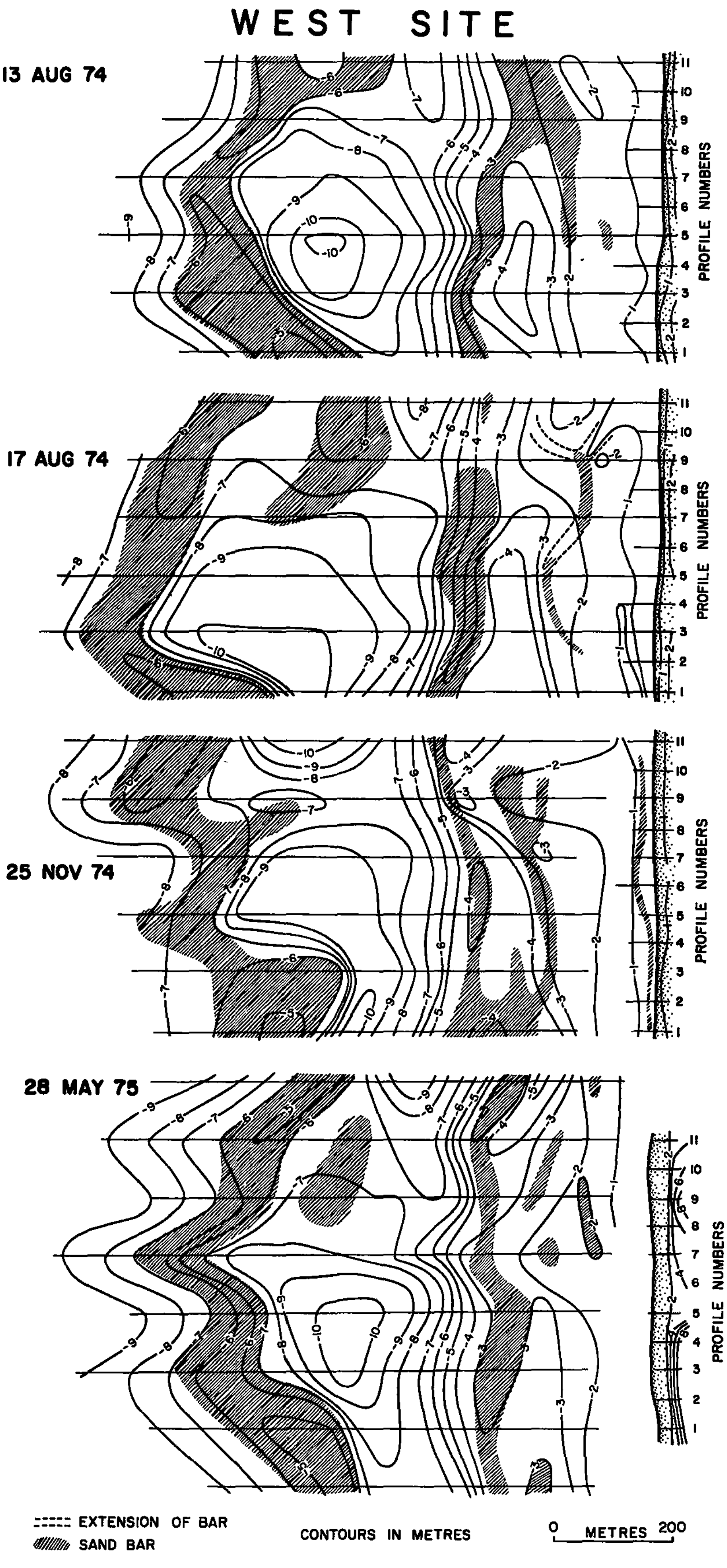
Sounding lines were surveyed along six of the beach profile lines (the odd-numbered lines). During the summer phase three surveys were carried out on the east site and two on the west site using a Furono FG-11/200 Mark 3 echo-sounder mounted in a 5m rubber boat. In the winter this sounder was installed on an 8m inboard-outboard Mason boat which also had a hull-mounted transducer and Raytheon DE-719 sounder. Both machines were operated simultaneously. Even with the larger, more stable boat, profiling proved difficult in November and only one survey was carried out on the west beach and two on the east beach. A further set of surveys was carried out in May 1975 during a subsequent visit to the sites. Position fixes were obtained using a Wild T-2 theodolite at a fixed location on shore to measure angles as the boat stayed on a course perpendicular to the beach.

Data Reduction:

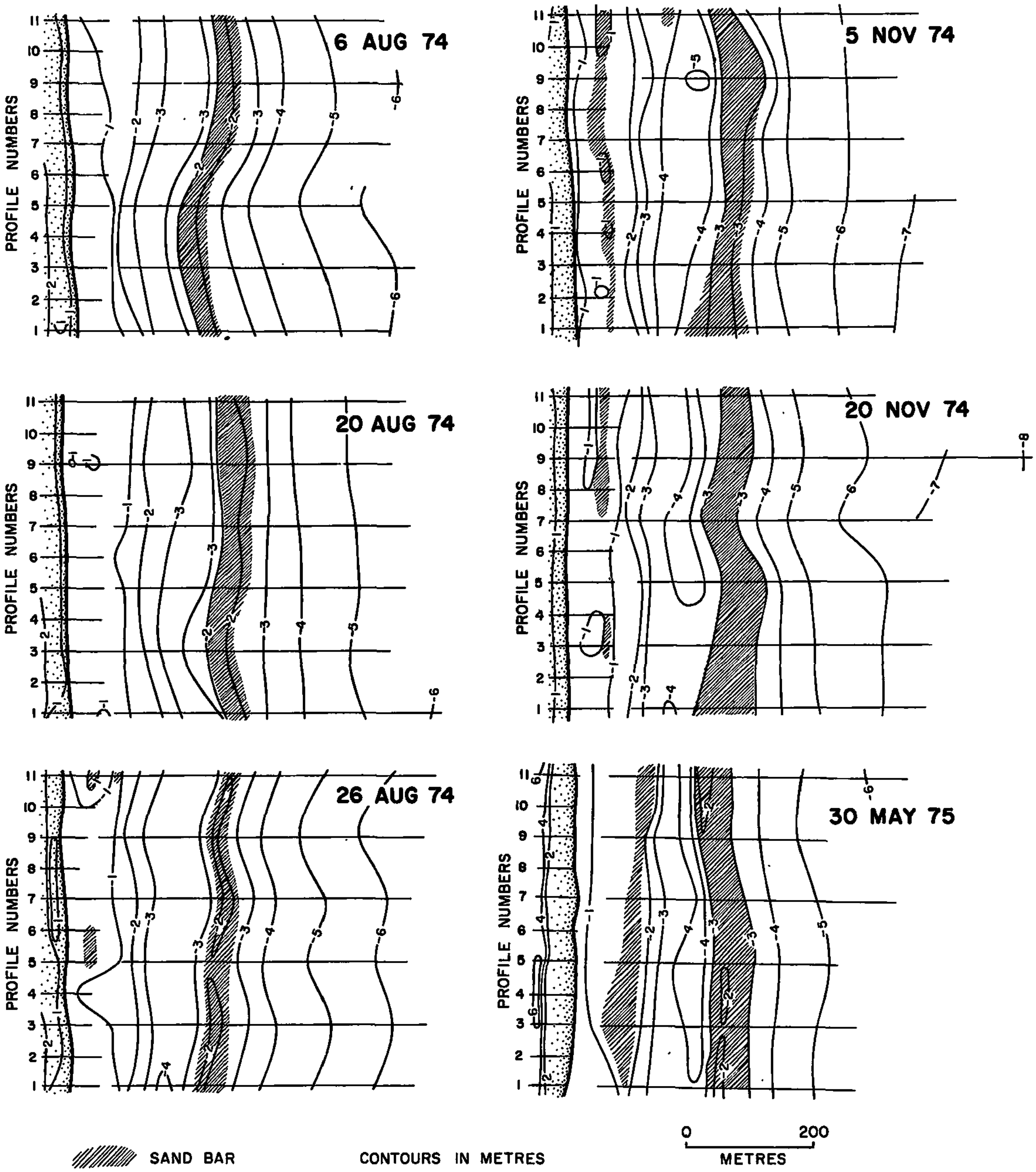
Triangulation fixes and depth values from echo-sounder profiles were computed and plotted manually to produce maps of the nearshore zone. The data were contoured manually and bar locations were derived from an interpretation of the mapped profile data and the echo-sounder rolls.

Data Format:

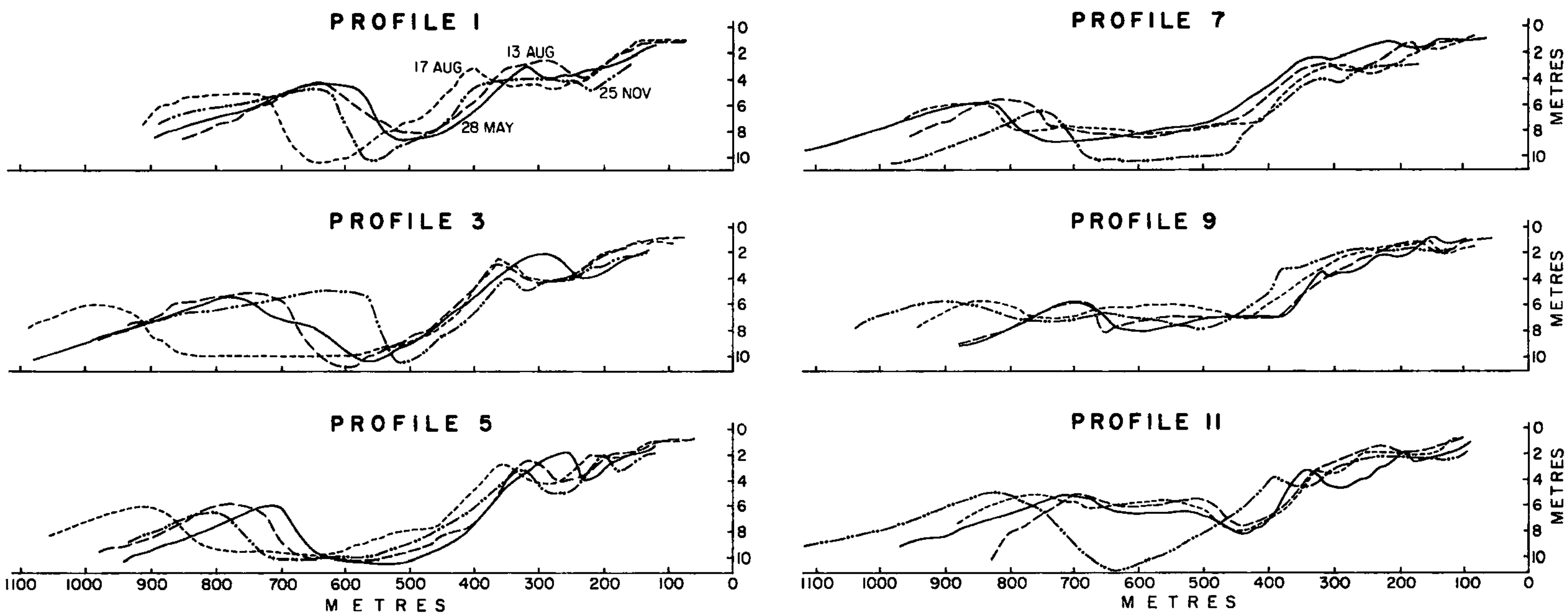
The data from each survey is presented as a contoured topographic map which includes data from the littoral zone derived from beach profile surveys. These maps are presented with no offshore exaggeration. In addition, profiles surveyed along each line are presented as a composite of profiles to indicate morphologic variations between surveys.


WEST SITE
13 AUG 74
17 AUG 74
25 NOV 74
28 MAY 75
PROFILE NUMBERS
EXTENSION OF BAR
SAND BAR
CONTOURS IN METRES
0 METRES 200

EAST SITE

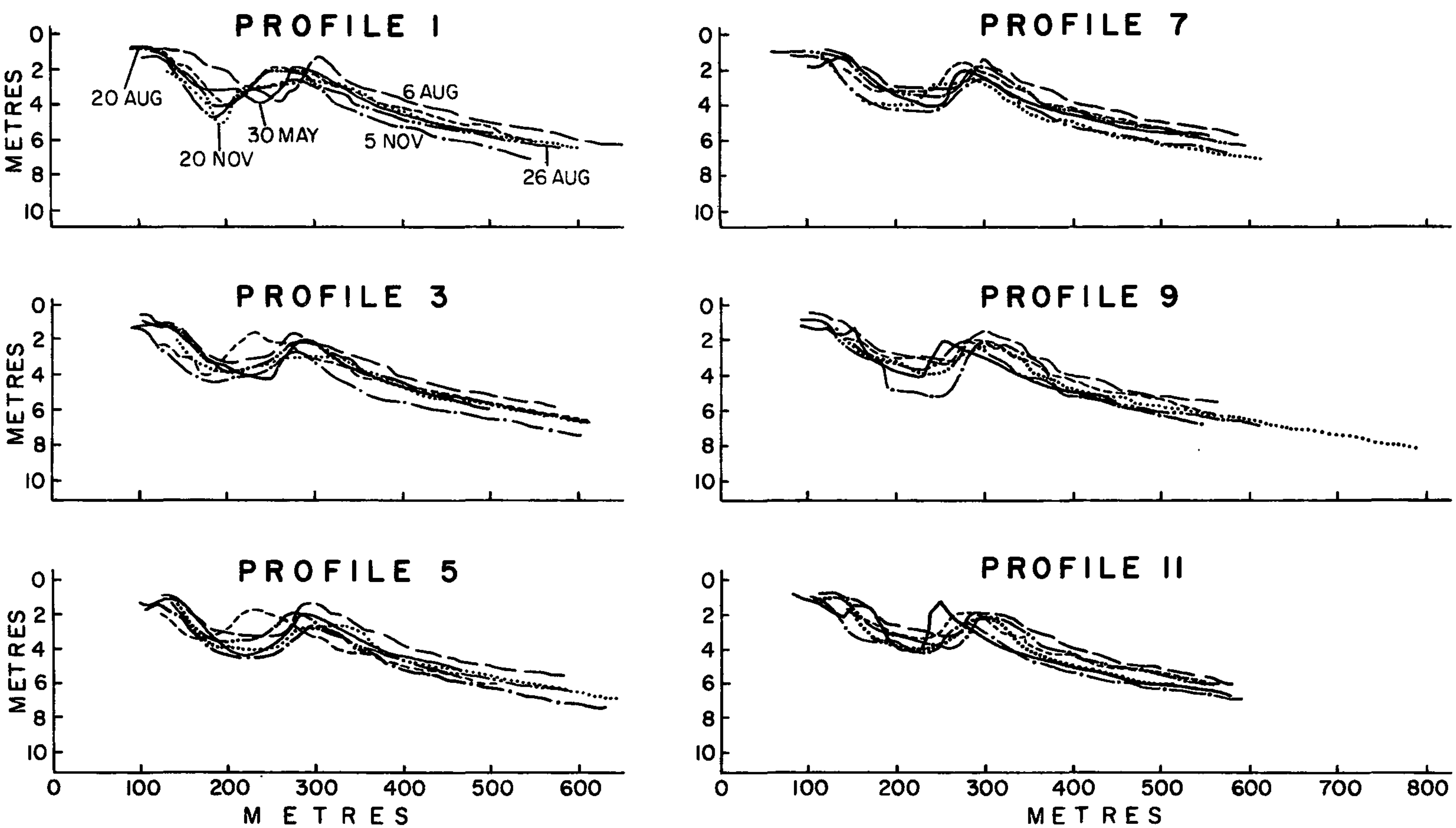

PROFILE NUMBERS
6 AUG 74
5 NOV 74
20 AUG 74
20 NOV 74
26 AUG 74
30 MAY 75
SAND BAR
CONTOURS IN METRES
0
200
METRES

WEST SITE



PROFILE 1
13 AUG
17 AUG
25 NOV
28 MAY
PROFILE 7
PROFILE 3
PROFILE 9
PROFILE 5
PROFILE 11
0 2 4 6 8 10
METRES
1100 1000 900 800 700 600 500 400 300 200 100 0
METRES

EAST SITE


PROFILE 1
PROFILE 3
PROFILE 5
PROFILE 7
PROFILE 9
PROFILE 11
METRES
20 AUG
6 AUG
30 MAY
5 NOV
20 NOV
26 AUG
0
2
4
6
8
10
0
100
200
300
400
500
600
700
800
METRES

PART 7

SEDIMENT SIZE DATA

CONTENTS

Sample Collection:

One set of samples was collected along a line adjacent to profile 11 at each site. The location of the bottom samples with respect to depth and morphology is given in Figure 7.1. Bottom samples were collected by divers.

Sample Analysis:

Samples were wet-sieved at an 0.5ϕ interval following procedures outlined by Owens (1974b). The results of the sieve analyses were reduced using a modified Woods Hole size analysis program (Schlee and Webster, 1965). This program calculates the median and four moment measures using a parabolic interpolation to a 0.125ϕ interval.

Data Format:

A precis of the computer output is presented in the same format as other littoral-zone sediment samples collected in the southern Gulf of St. Lawrence (Owens, 1974b). The abbreviations are discussed fully by Owens (1974b). In the "SEDIMENTARY ENVIRONMENT" column,"b" refers to the central beach face, "d" to the berm, and "g" to the dune. Other abbreviations are fs (fine sand), ms (medium sand), cs (coarse sand), w (well sorted) and vw (very well sorted).

SEDIMENT SAMPLE LOCATIONS

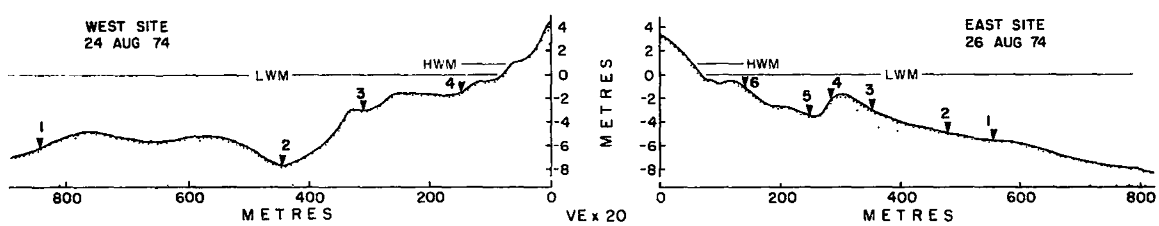


Figure 7.1 Location of bottom surface samples collected during the summer phase. These profiles show the sample sites in relation to the nearshore topography.

STATION NUMBER	SHORE ZONE GEOMORPHOLOGY	SAMPLE SITE	SEDIMENTARY ENVIRONMENT	SIZE FRACTIONS			SEDIMENT TYPE		MEDIAN	MEAN	STANDARD DEVIATION	SORTING
				Coarse >-2.0φ	Sand	Fine <+4.0φ	Major Mode(s)	Minor Mode(s)				
MI-West	outer nearshore bar	1		-	99.92	0.08	ms		1.71	1.53	0.39	w
MI-West	trough	2		-	99.94	0.06	ms		1.49	1.41	0.39	w
MI-West	inner nearshore bar	3		-	99.99	0.01	ms	cs	1.29	1.14	0.33	vw
MI-West	nearshore	4		-	100.00	-	ms	cs	1.29	1.15	0.31	vw
MI-West	intertidal zone	5	b	-	100.00	-	cs,ms		1.08	1.02	0.33	w
MI-West	beach berm	6	d	-	100.00	-	cs,ms		0.98	0.93	0.30	vw
MI-West (10.3)	dune	Z	g	-	99.56	0.44	ms		1.53	1.53	0.34	vw

STATION NUMBER	SHORE ZONE GEOMORPHOLOGY	SAMPLE SITE	SEDIMENTARY ENVIRONMENT	SIZE FRACTIONS			SEDIMENT TYPE		MEDIAN	MEAN	STANDARD DEVIATION	SORTING
				Coarse >-2.0ϕ	Sand	Fine <+4.0ϕ	Major Mode(s)	Minor Mode(s)				
MI-East	offshore	1		-	99.71	0.29	fs		2.48	2.36	0.42	w
MI-East	offshore	2		-	99.69	0.31	fs	ms	2.36	2.22	0.40	w
MI-East	outer nearshore bar	3		-	99.94	0.06	ms,fs		1.98	1.87	0.45	w
MI-East	crest, outer nearshore bar	4		-	99.99	0.01	ms		1.44	1.36	0.32	vw
MI-East	trough	5		-	99.99	0.01	ms		1.49	1.38	0.39	w
MI-East	inner nearshore bar	6		-	99.98	0.02	ms	fs	1.84	1.67	0.45	w
MI-East	intertidal zone	7	b	-	99.96	0.04	ms,fs		1.96	1.81	0.43	w
MI-East	beach berm	8	d	-	100.00	-	ms		1.57	1.49	0.34	vw
MI-East	dune	9	g	-	99.97	0.03	ms,fs		2.14	1.91	0.50	w

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