ISDN 1039-3218

Field Measurements of Suspended Sediment Concentrations in Port Phillip Bay

Z.You, P.R.Greilach, J.F.Turnbull,
D.N.Hatton and K.P.Black
Marine and Freshwater Resources Institute
115 Victoria Parade, Fitzroy, Victoria Australia

Locked Bag 7, Collins Street East Post Office
Melbourne 8003, Australia

Technical Report No.28

Port Phillip Bay Environmental Study
CSIRO Environmental Projects Office
Building 9, Forestry Site, Banks Street
Yarralumla, ACT, Australia

PO Box 225, Dickson, ACT 2602, Australia

March 1997

EXECUTIVE SUMMARY

An understanding of suspended sediment concentrations, current velocities, bed forms, wave orbital velocities near the bed, and the nature of sediments in Port Phillip Bay are required to calibrate the sediment transport model being developed by the Port Phillip Bay Environmental Study. The Victorian Institute of Marine Sciences (VIMS), now operating as part of the Marine and Freshwater Resources Institute, was commissioned to make appropriate field measurements within Port Phillip Bay. The programme commenced in June 1994 and finished in September 1995

For the task, VIMS made use of their self designed and built SEDCAM instrument frame. SEDCAM was placed on the bottom for periods of 30 -50 days at a series of sites around the Bay. Instruments on the frame enabled the measurement of turbidity, currents, wave motion, and light levels. A video camera was also mounted on the frame to enable quality control of data, e.g. show when weed blocked sensor heads. Bed sensors were placed adjacent to the frame for the measurement of bed erosion/deposition levels.

As with any automated measuring process the instruments were susceptible to in situ damage, particularly the sedimeter. At site 8 the SEDCAM was actually dragged from its position, resulting in several of the instruments being damaged. Being a marine environment the instruments were often fouled by weed, algae and in some circumstances barnacle growth. Several methods to reduce fouling were introduced during the programme. Problems with batteries and other electronic equipment also resulted in intermittent operation of the instruments at some sites.

Sufficient measurements were made to establish most of the task objectives. Current speeds measured at the eight sites were generally less than 10 cm/s. The wave motion close to the bed was rather weak. The significant wave velocity amplitudes at the eight sites were generally less than 8 cm/s. Suspended sediment concentrations are generally low (most of the time) and in the order of 100 mg/L The bed forms observed at the eight sites are generally flat, but sediment types and sizes are different. This implies that the physical bed roughness in Port Phillip Bay should not be treated as a constant.

TABLE OF CONTENTS

Page No.

Executive Summary 2
Table of Contents.....3
List of Tables.....4
List of Figures.....4

1. INTRODUCTION 5

2. RESULTS.....7

3. CONCLUSIONS.....13

4. ACKNOWLEDGMENTS.....13

5. REFERENCES.....13

6. APPENDICES 14

Appendix 1 - Current measurements..... 14
Appendix 2 - Wave-induced velocity measurements..... 43
Appendix 3 - Suspended sediment concentration measurements..... ..... .53
Appendix 4 - Light intensity (PAR) measurements..... 70
Appendix 5 - Grain size analyses..... 96

LIST OF TABLES

Page No.

Table 1: Deployment site details....6
Table 2: Instruments deployed during field programme....6
Table 3: Sediment trap data collected at sites 3, 6 and 9....7

LIST OF FIGURES

Page No.

Figure 1: The locations of the SEDCAM sites in Port Phillip Bay.....5
Figure 2: Sediment concentrations measured with a water pump at 19 cm above bed at site 2 (Sands Region) in Port Phillip Bay....8
Figure 3: Sediment concentrations measured with a water pump at 10 cm above bed at site 3 (Central Port Phillip Bay) in Port Phillip Bay.....8
Figure 4: Sediment concentrations measured with a water pump at 15 cm above bed at site 5 (Red Bluff) in Port Phillip Bay.....9
Figure 5: Sediment concentrations measured with a water pump at 11 cm above bed at site 6 (Yarra River) in Port Phillip Bay.....9
Figure 6: Sediment concentrations measured with a water pump at 10 cm above bed at site 7 (Spoil Ground) in Port Phillip Bay.....10
Figure 7: Sediment concentrations measured with a water pump at 10 cm above bed at site 9 (Corio Bay) in Port Phillip Bay....10
Figure 8: Sediment deposit rates above bed measured with sediment traps 11
Figure 9: Time-averaged sediment concentrations at sites 3, 6 and 9 calculated from sediment trap data via Equation 4.5.2.....12

1. INTRODUCTION

Field measurements of suspended sediment concentrations, current velocities, bed forms, wave orbital velocities near the bed, and the nature of sediments in Port Phillip Bay were needed to calibrate the sediment transport model being developed by the Port Phillip Bay Environmental Study. The Victorian Institute of Marine Sciences (VIMS) was commissioned to measure suspended sediment concentrations, current velocities and light transmission at eight sites within Port Phillip Bay (Figure 1). Coordinates and depths of each site are given in Table 1. A list of all the instruments deployed at each site during the field programme and the days of data recorded are presented in Table 2.

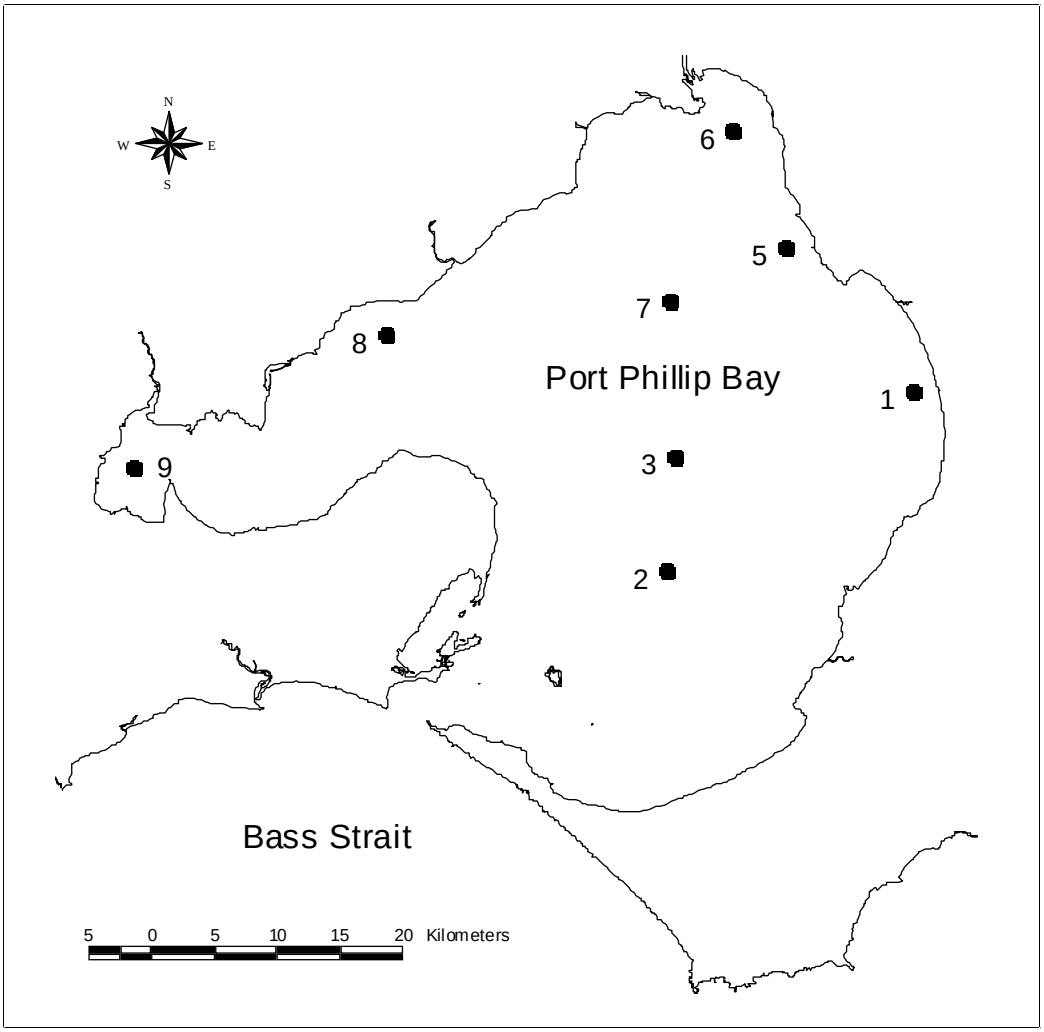


Figure 1: The locations of the SEDCAM sites in Port Phillip Bay.

Table 1: Deployment site details

Site No	Deploy No	Site name	Site Position Latitude	Longitude	Water depth (m)
1	6	Patterson River	38° 04.502'	145° 05.795'	7.7
2	1	Sands Region	38° 11.994'	144° 52.167'	23.4
3	7	Central Port Phillip Bay	38° 07.130'	144° 52.790'	24.8
5	2	Red Bluff	37° 58.273'	144° 59.029'	14.6
6	4	Yarra River	37° 53.161'	144° 56.328'	8.5
7	5	Spoil Ground	38° 00.447'	144° 52.695'	15.6
8	3	Werribee Treatment Plant	38° 01.606'	144° 37.280'	5.1
9	8	Corio Bay	38° 07.035'	144° 23.450'	8.3

The field measurements were made with the SEDCAM instrument frame on which two optical backscatterance sensors (OBS), two photosynthetically active radiation (PAR) light meters, current meters (Neil Brown SACM-3, InterOcean S4 and SonTek ADV), one fluorometer, sediment traps, and an underwater video camera were mounted. The SEDCAM frame was designed and built by VIMS (Black 1995). Field data was collected at each site for approximately one month. The field study program started in June 1994 and finished in September 1995. A full description of the set-up and calibration of the instruments is available from the authors.

Table 2: Instruments deployed during field programme

Site no.	Deployment period	Days of useful data recorded						Comment
		Video	Current meters	OBS	Light meters	Fluoro-meter	Water sampler	
1	5/5/95 - 5/6/95	21	NB 32	32	32	✔	0	Light coating of silt on Neil Brown reflector mirror. Insufficient sediment retained in water sampler bags for analysis
2	17/6/94 - 5/8/94	35	NB 22	50	35	✔	14	
3	16/6/95 - 24/7/95	33	NB 39 ADV 0	21	39	✘	5	ADV failed to record. Internal computer failure. Light film on camera lens and OBS. Divers failed to cover sediment traps.
5	19/8/94 - 26/9/94	27	NB 23	39	39	✔	11	
6	16/12/94 - 20/1/95	20	NB 36	11	36	✔	12	Light fouling of instruments. Camera lens dirty with growth. fluorometer lenses lightly fouled.
7	28/3/95 - 27/4/95	23	NB 31	0	31	✔	10	Neil Brown had light fouling of filamentous weed. Camera lens had light fouling and some barnacles. Light/medium coating of weed on fluorometer.
8	28/10/94 - 5/12/94	31	S4 32 ADV 0	39	39	✔	3	SEDCAM dragged. Sedimeter broken. Watersampler frame collapsed. Fluorometer and water inlet pushed into bed. Heavy fouling of frames. ADV failed to record data.
9	8/8/95 - 12/9/95	31	NB 35 ADV 35	36	36	✔	19	Light to moderate fouling of some instruments. Half of vertical fluorometer sensor fouled. Frame generally clean but foul smelling.

2. RESULTS

Results for current measurements, wave-induced velocity measurements, suspended sediment concentrations (from OBS), light intensities and grain size analysis are presented in Appendices 1 to 5.

Suspended sediment concentrations measured by filtration of pumped water samples are shown in Figure 2 to 7. The values for "Sediment" represent the weight of material collected after combustion at 450°C i.e. after removal of organic matter.

Sediment collected by the traps or tubes attached to the SEDCAM frame at various heights above the bottom proved rather scanty. Only three sites (3, 6 and 9) returned enough material for analysis. The actual weights collected are shown in Table 3. From these values, sediment deposit rates (Figure 8) and time-averaged sediment concentrations were calculated (Figure 9).

Table 3: Sediment trap data collected at sites 3, 6 and 9.

Site	Height (m)	Mass 105°C (gram)	Mass 450°C (gram)	Duration T_d (day)	Area A_{st} (cm^2)	Grain Size d (mm)
3	0.55	0.93	0.83	38	58.1	0.015
	1.12	0.77	0.69			
	1.50	1.03	0.90			
6	0.65	45.30	43.30	36	58.1	0.490
	1.25	47.15	45.50			
	1.60	45.80	43.95			
9	0.56	2.00	1.80	34	58.1	0.030
	1.08	1.55	1.40			
	1.54	2.30	2.10			

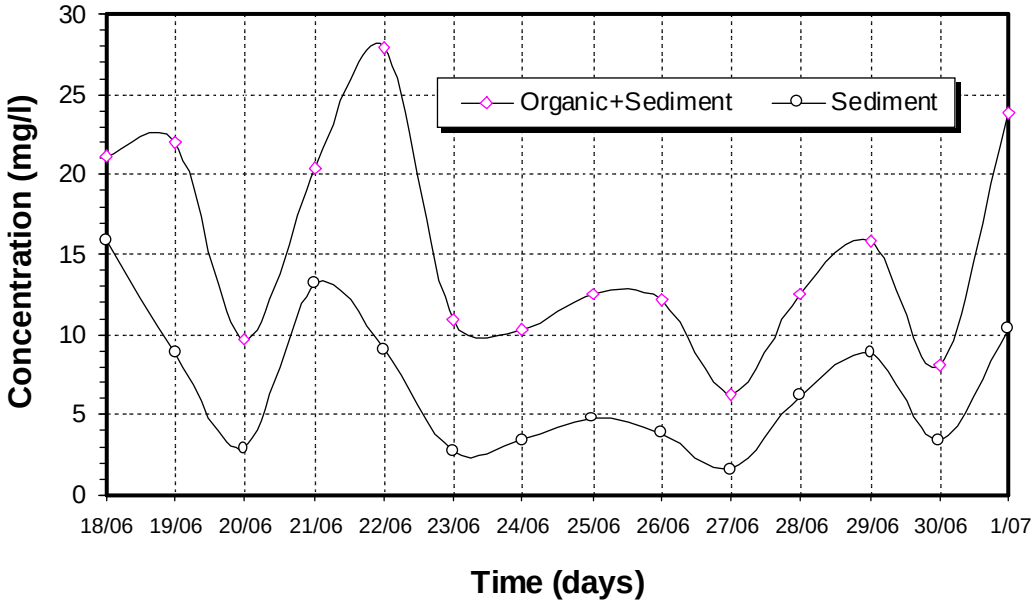


Figure 2: Sediment concentrations measured with a water pump at 19 cm above bed at site 2 (Sands Region) in Port Phillip Bay.

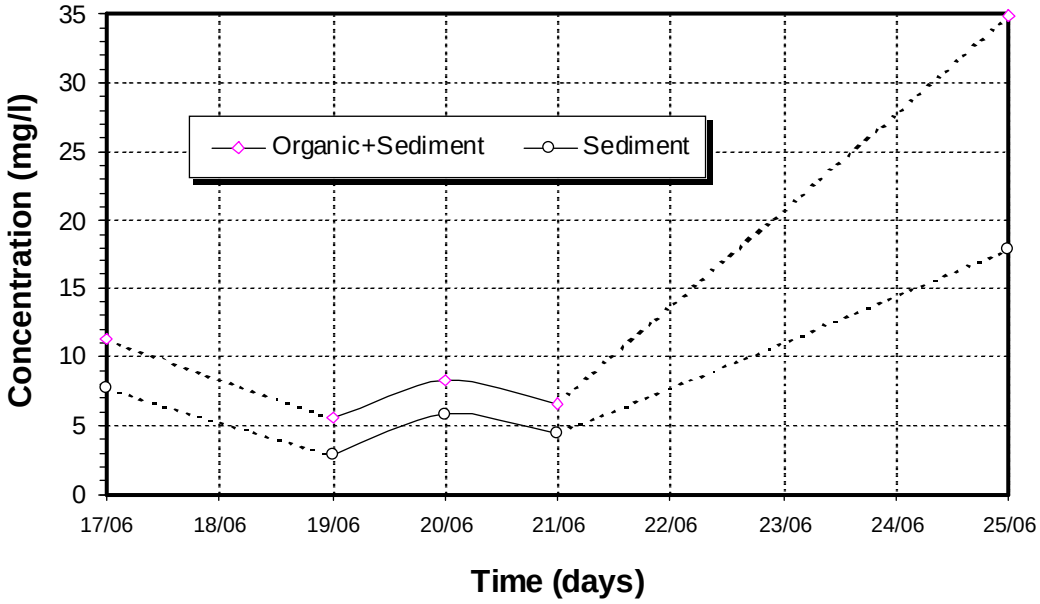


Figure 3: Sediment concentrations measured with a water pump at 10 cm above bed at site 3 (Central Port Phillip Bay) in Port Phillip Bay.

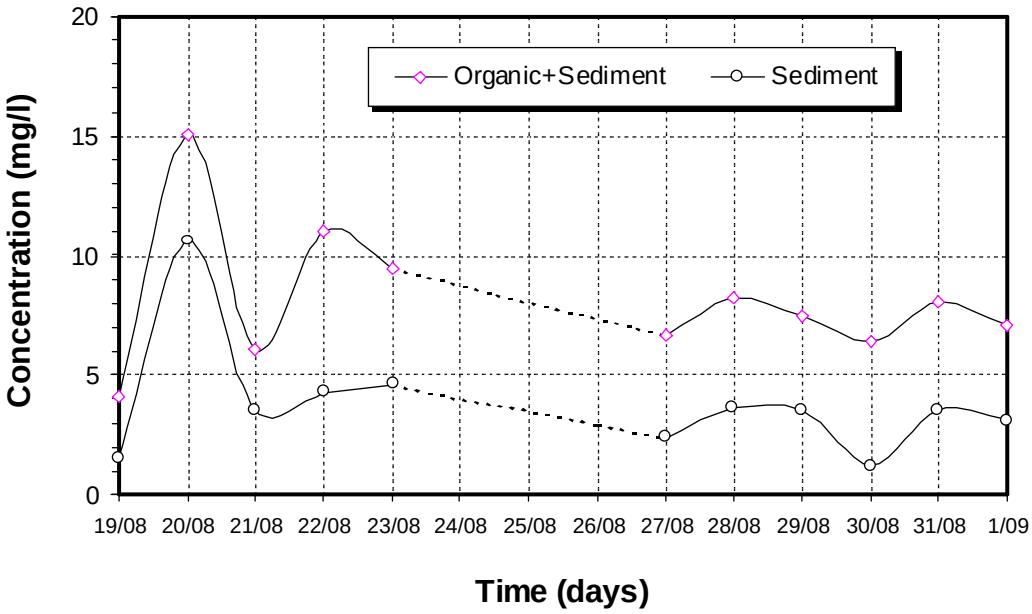


Figure 4: Sediment concentrations measured with a water pump at 15 cm above bed at site 5 (Red Bluff) in Port Phillip Bay.

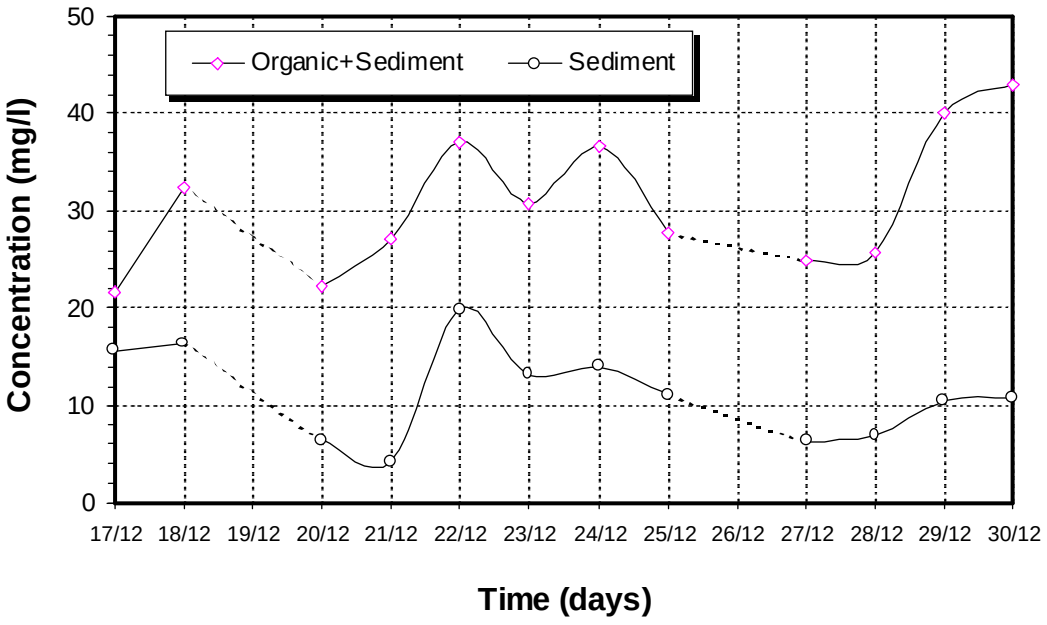


Figure 5: Sediment concentrations measured with a water pump at 11 cm above bed at site 6 (Yarra River) in Port Phillip Bay.

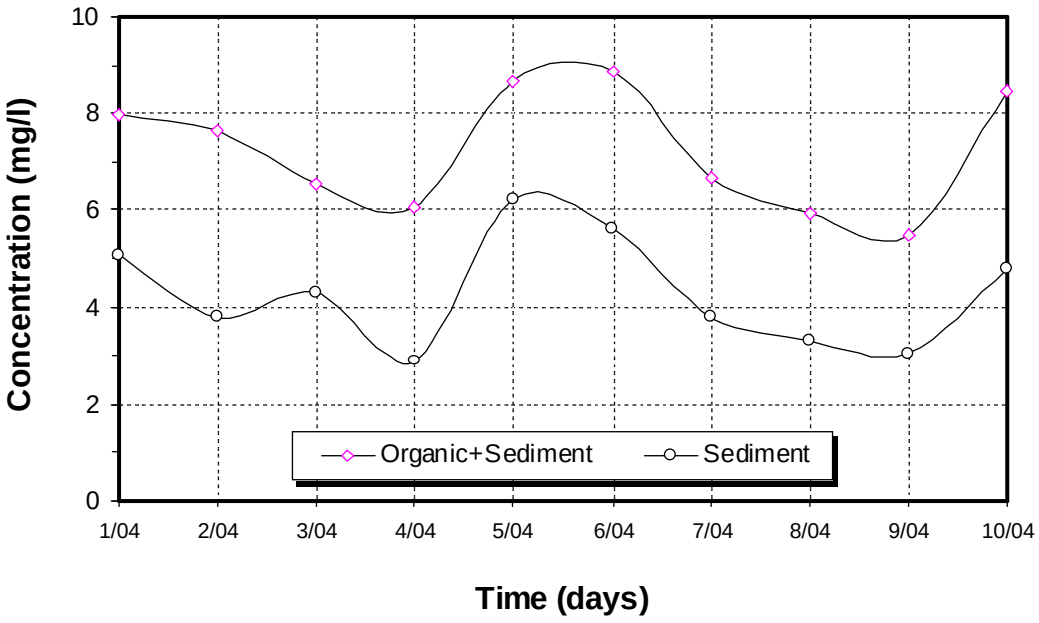


Figure 6: Sediment concentrations measured with a water pump at 10 cm above bed at site 7 (Spoil Ground) in Port Phillip Bay.

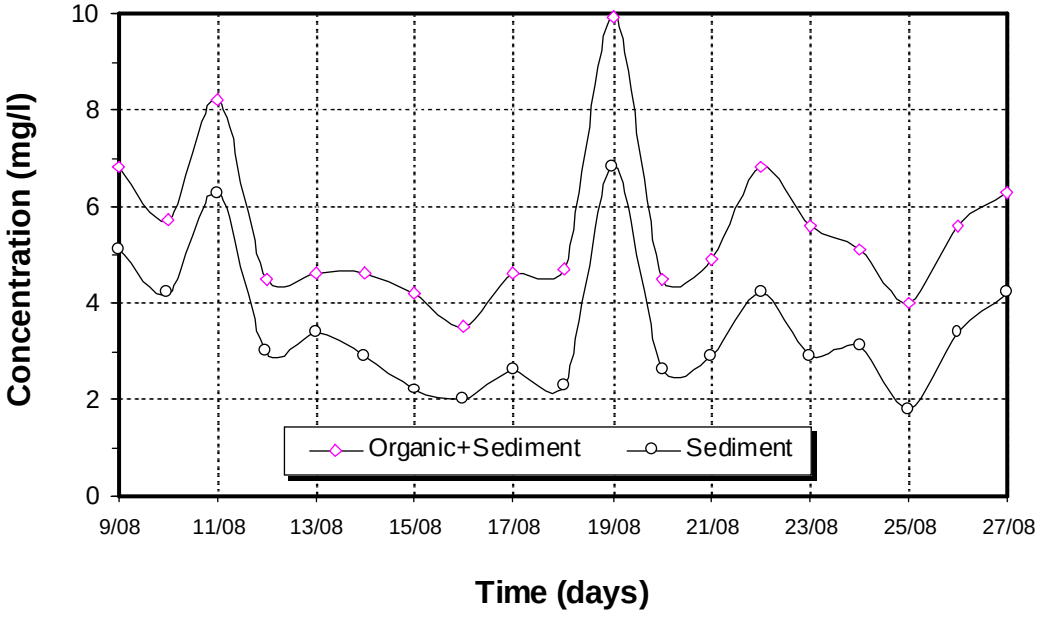


Figure 7: Sediment concentrations measured with a water pump at 10 cm above bed at site 9 (Corio Bay) in Port Phillip Bay.

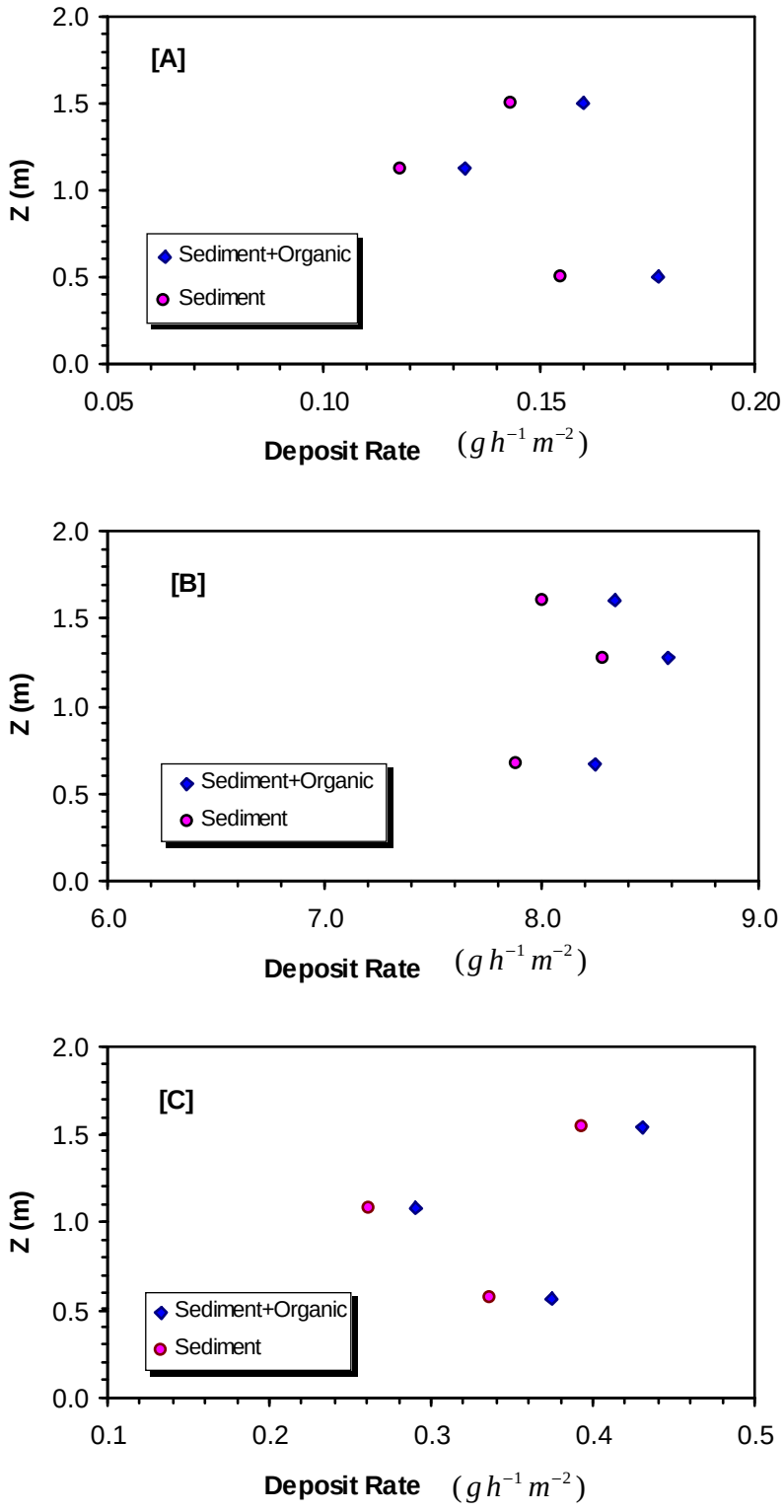


Figure 8: Sediment deposit rates above the bed measured with sediment traps.

[A]	site3	Central Port Phillip Bay	mud;
[B]	site 6	Yarra River	coarse sand
[C]	site 9	Corio Bay	mud.

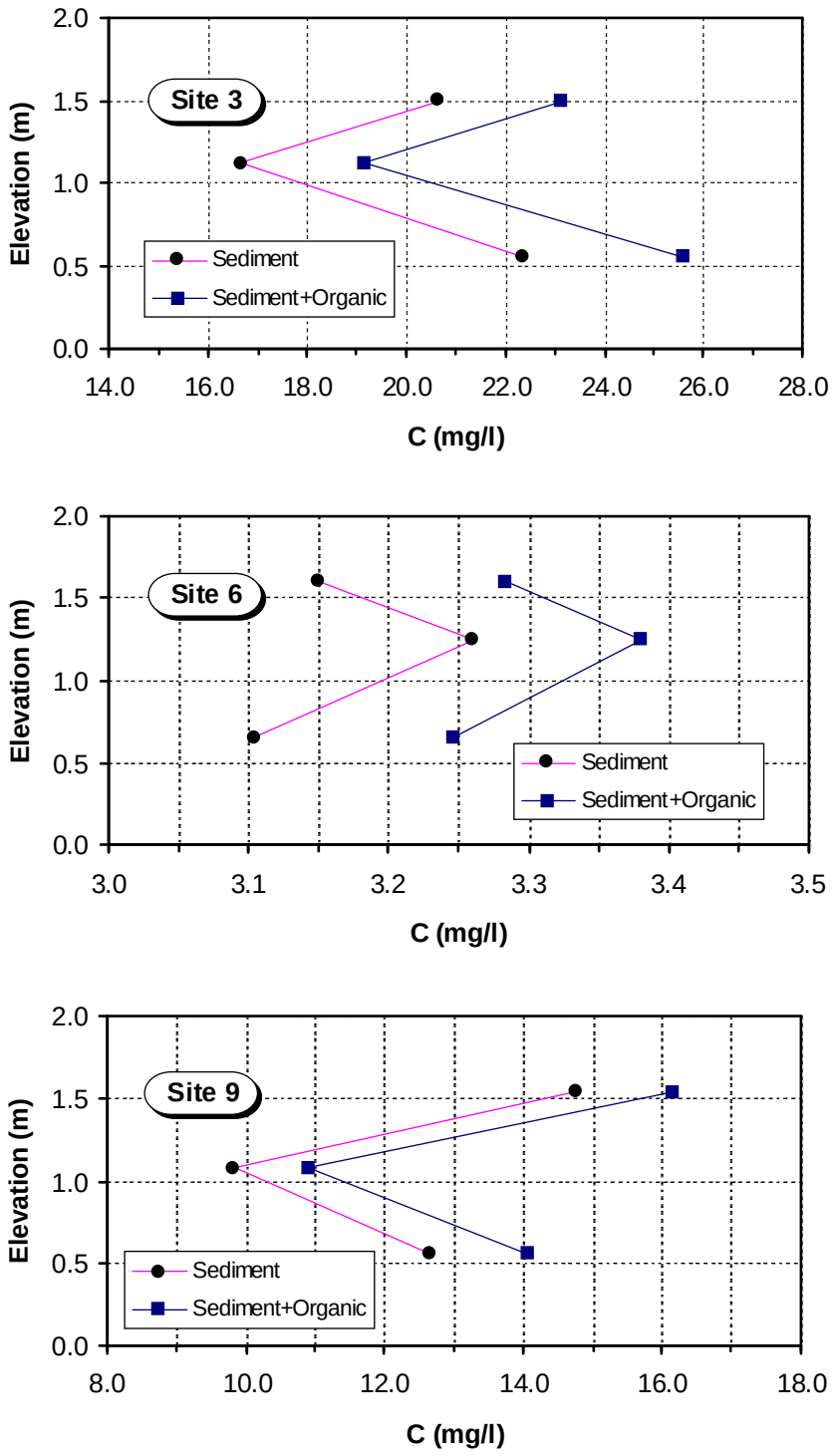


Figure 9: Time-averaged sediment concentrations at sites 3, 6 and 9 calculated from sediment trap data.

3. CONCLUSIONS

Comprehensive field measurements of suspended sediment concentrations, time-averaged current velocities, wave-induced oscillatory velocities, and light transmission in Port Phillip Bay were made with the SEDCAM frame from June 1994 to September 1995. The following main conclusions from the field study can be made that:

1. Current speeds measured at the eight sites within Port Phillip Bay are generally small and less than 10 cm/s at most of time. The wave motion close to the bed is rather weak. The significant wave velocity amplitudes measured at the eight sites are generally less than 8 cm/s.

2. Suspended sediment concentrations measured at the eight sites within Port Phillip Bay are generally low most of the time and of the order of 100 mg/L. Extremely high sediment concentrations shown in Appendix 5 may be caused by floating seagrass, fish movement and biological growth on the OBS sensors. Thus, appropriate care has to be taken with the reduction and interpretation of the data.

3. The bed forms observed at the eight sites within Port Phillip Bay are generally flat, but sediment types and sizes are different. This implies that the physical bed roughness in Port Phillip Bay should not be treated as a constant.

4. The quality of light measurements has been significantly improved by using light meters with newly designed benthic wipers attached.

4. ACKNOWLEDGMENTS

Melbourne Water through the Port Phillip Bay Environmental Study provided financial support for the task. Tony Chiffings (Melbourne Water) and John Hunter (CSIRO) assisted in the project design, and site selections.

Stephen Walker (CSIRO) reviewed the Task P7 (SEDCAM) report, adding valuable comment. Brian Newell, Doug Hall and Robert Molloy provided project support and editing for the final report.

5. REFERENCES

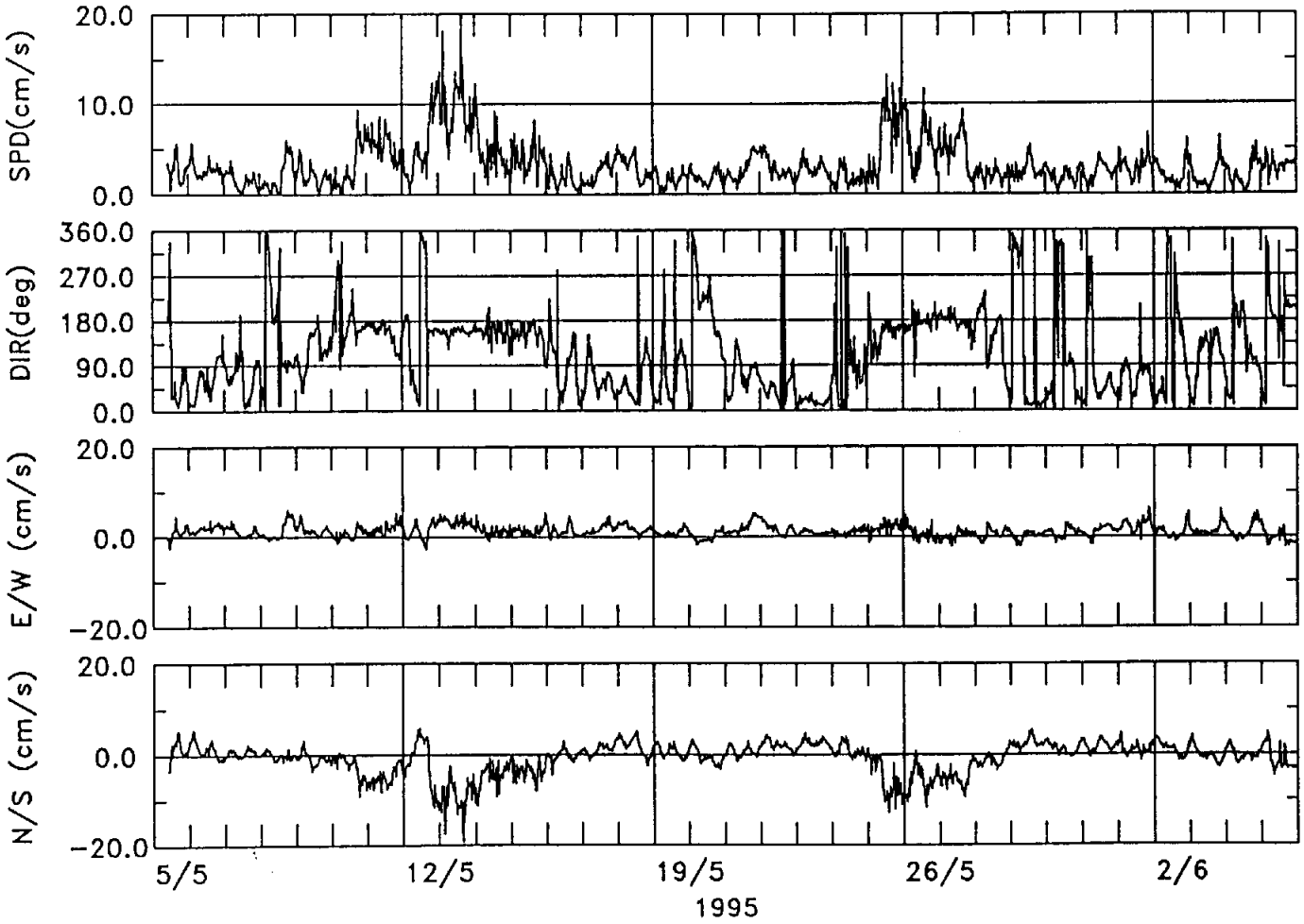
Black, K. (1995). *SEDCAM - a bottom mounted sediment, wave and current monitoring system.*. Technical Communication for Journal of Coastal Research.

6. APPENDICES

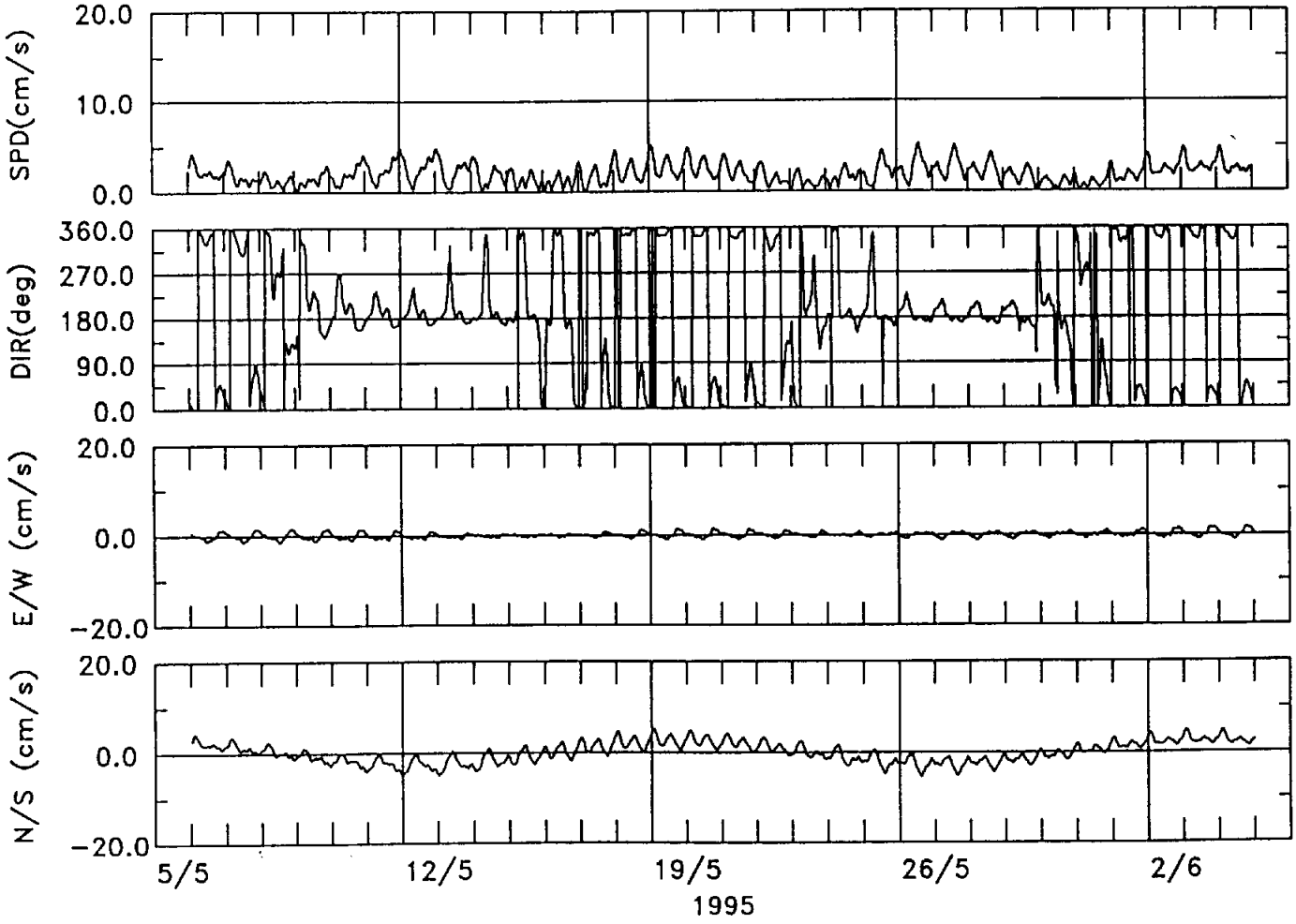
6.1. Appendix 1 - Current measurements

Measurements of horizontal currents were taken using Neil Brown SACM-3 and InterOcean S4 current meters. Measurements of 3D currents were taken using a SonTek ADV current meter.

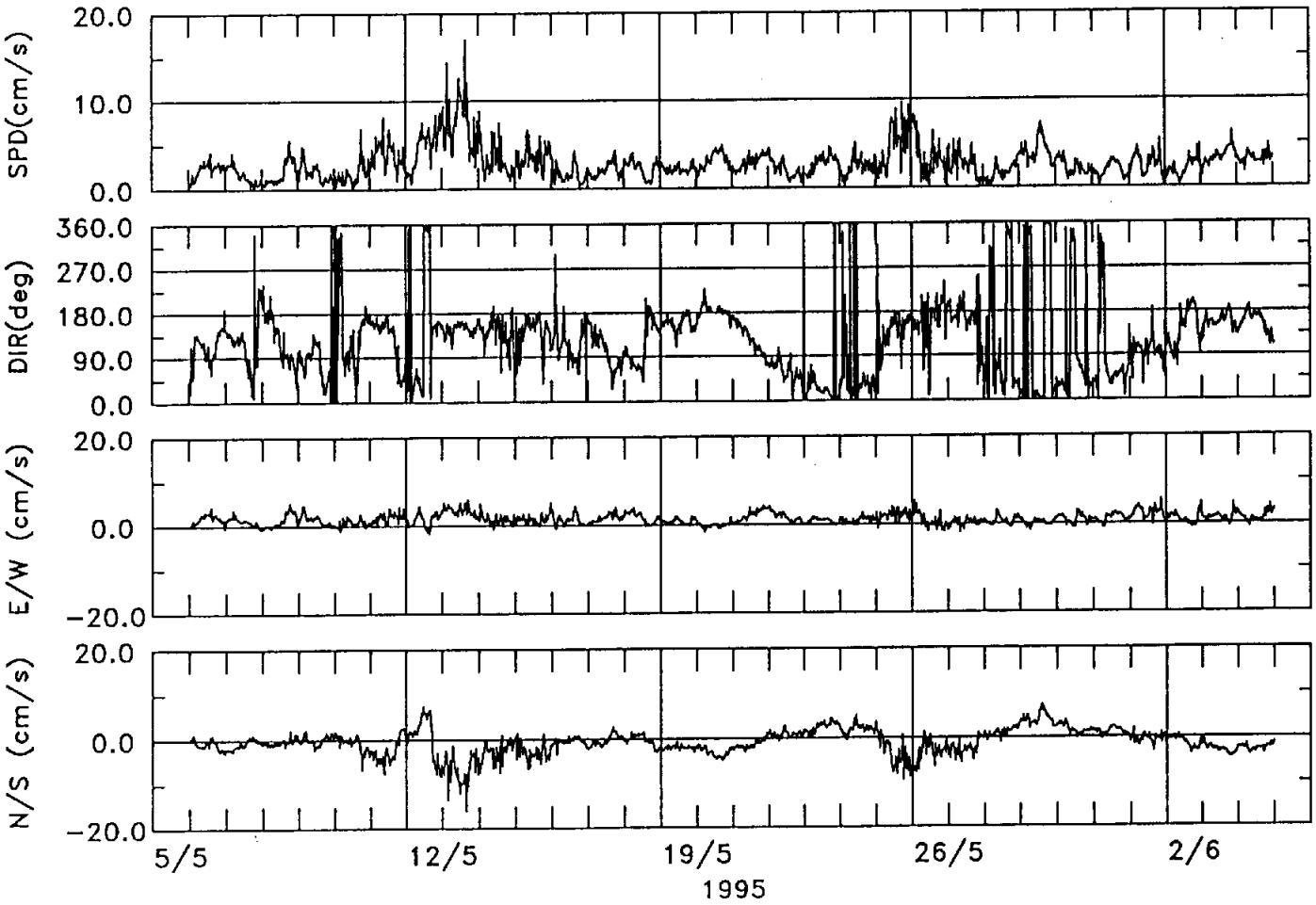
P7 SITE 1. MEASURED SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 4.502'(S) 145° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 - 5/06/95 EST



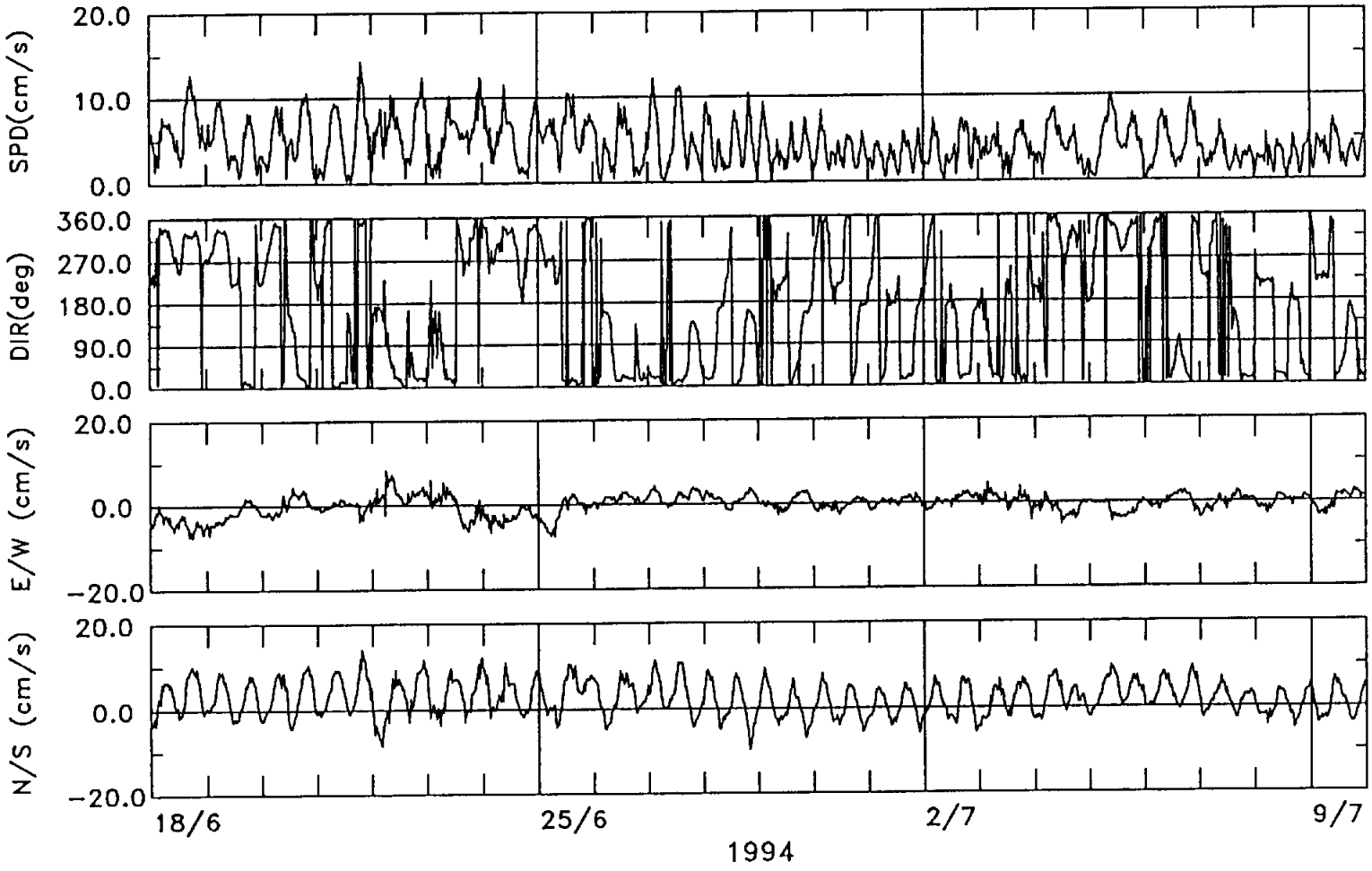
P7 SITE 1. PREDICTED TIDAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 4.502'(S) 145° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 – 5/06/95 EST



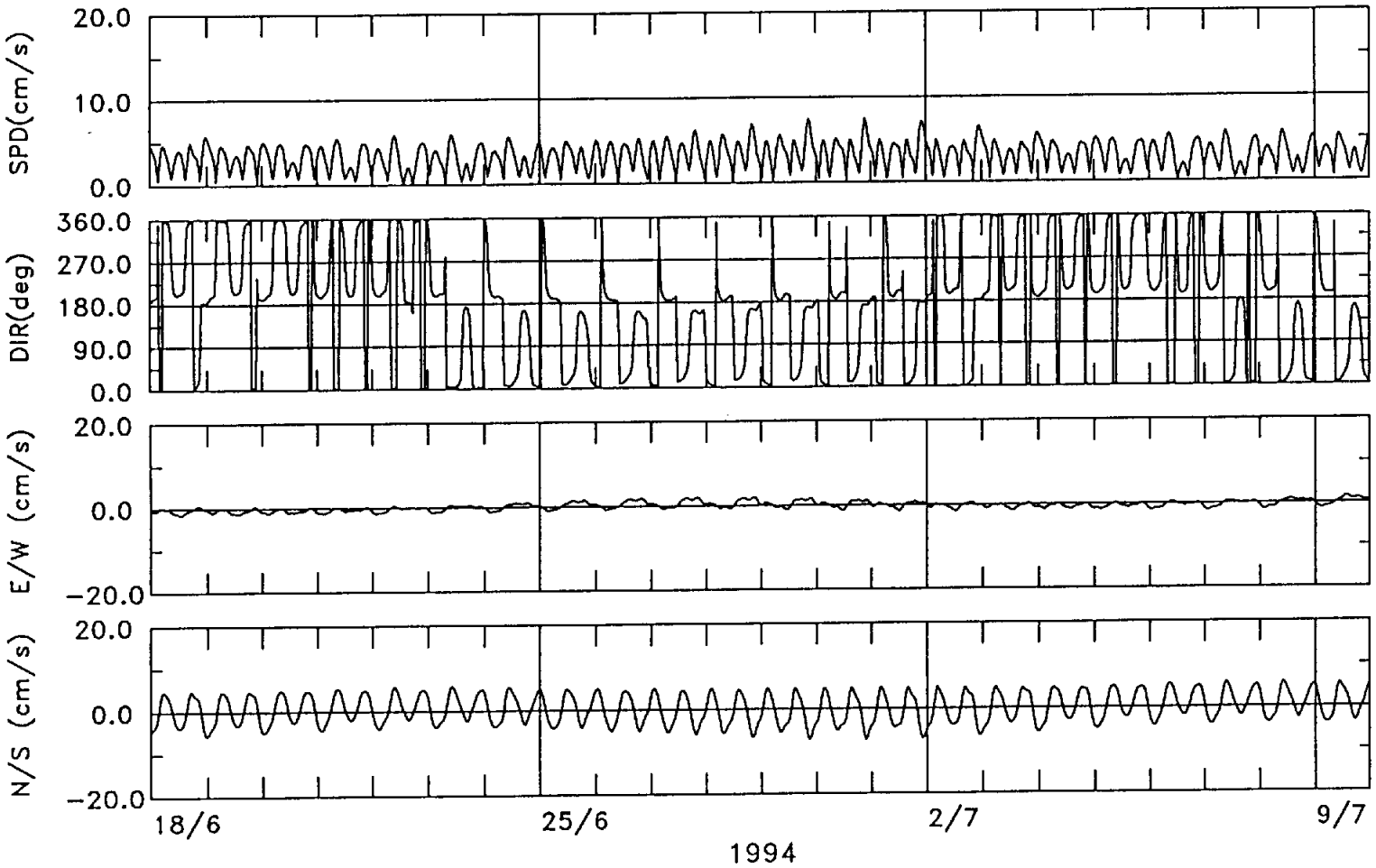
P7 SITE 1. RESIDUAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 4.502'(S) 145° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 – 5/06/95 EST



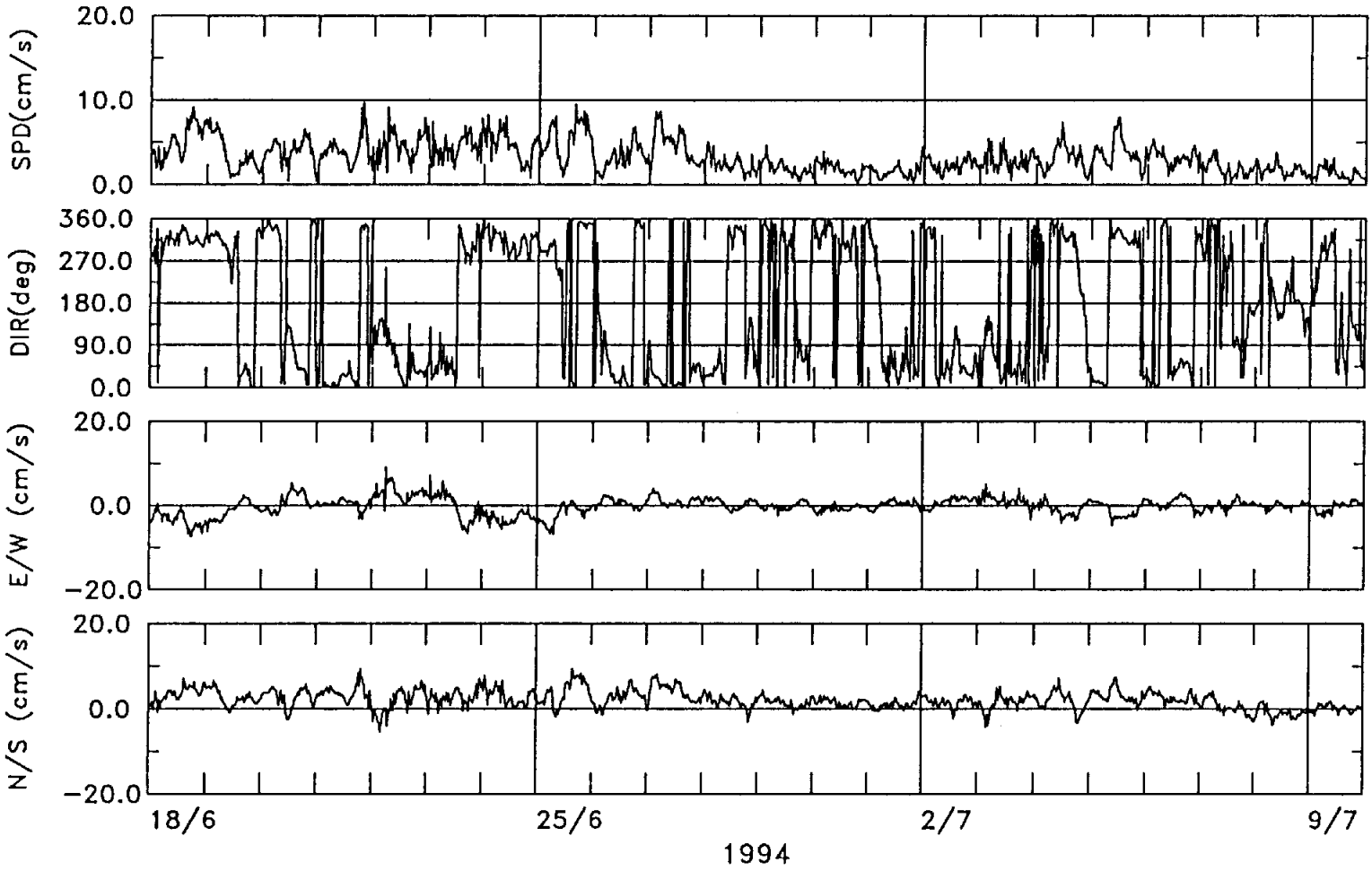
P7 SITE 2. MEASURED SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*4 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 0.3 metres OCEAN DEPTH 23.6 metres
PERIOD 18/06/94 - 10/07/94 EST



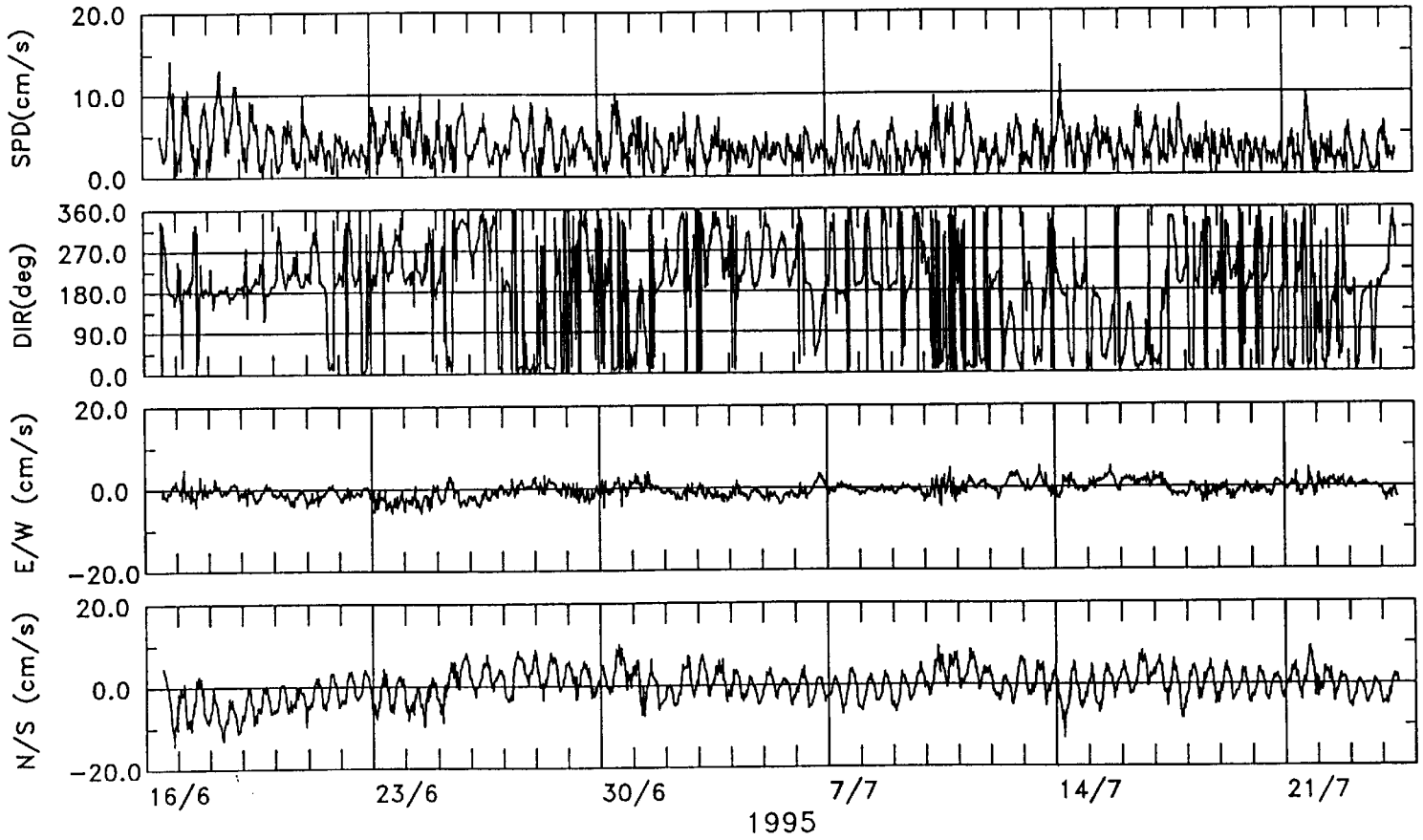
P7 SITE 2. PREDICTED TIDAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*4 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 0.3 metres OCEAN DEPTH 23.6 metres
PERIOD 18/06/94 - 10/07/94 EST



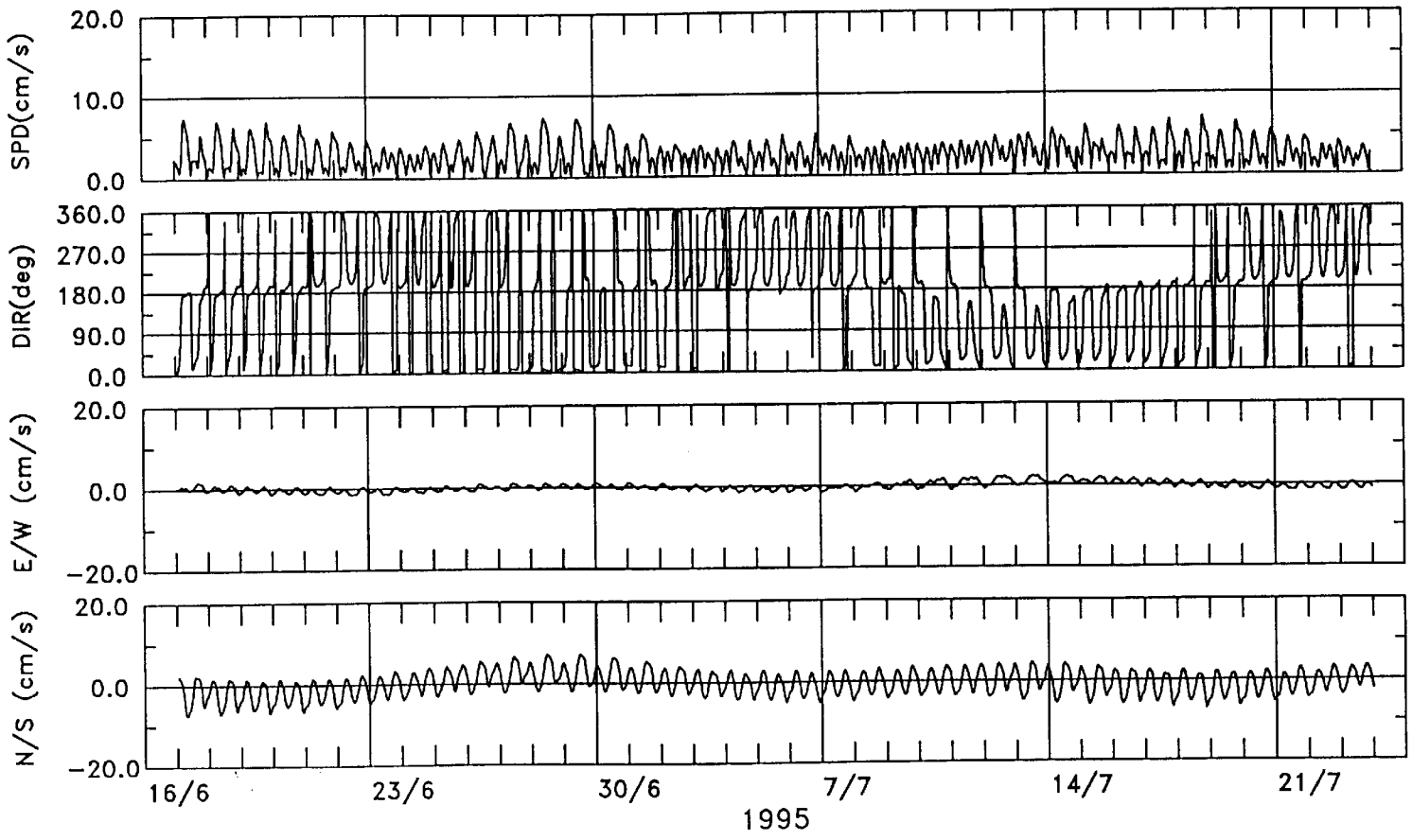
P7 SITE 2. RESIDUAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*4 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 0.3 metres OCEAN DEPTH 23.6 metres
PERIOD 18/06/94 - 10/07/94 EST



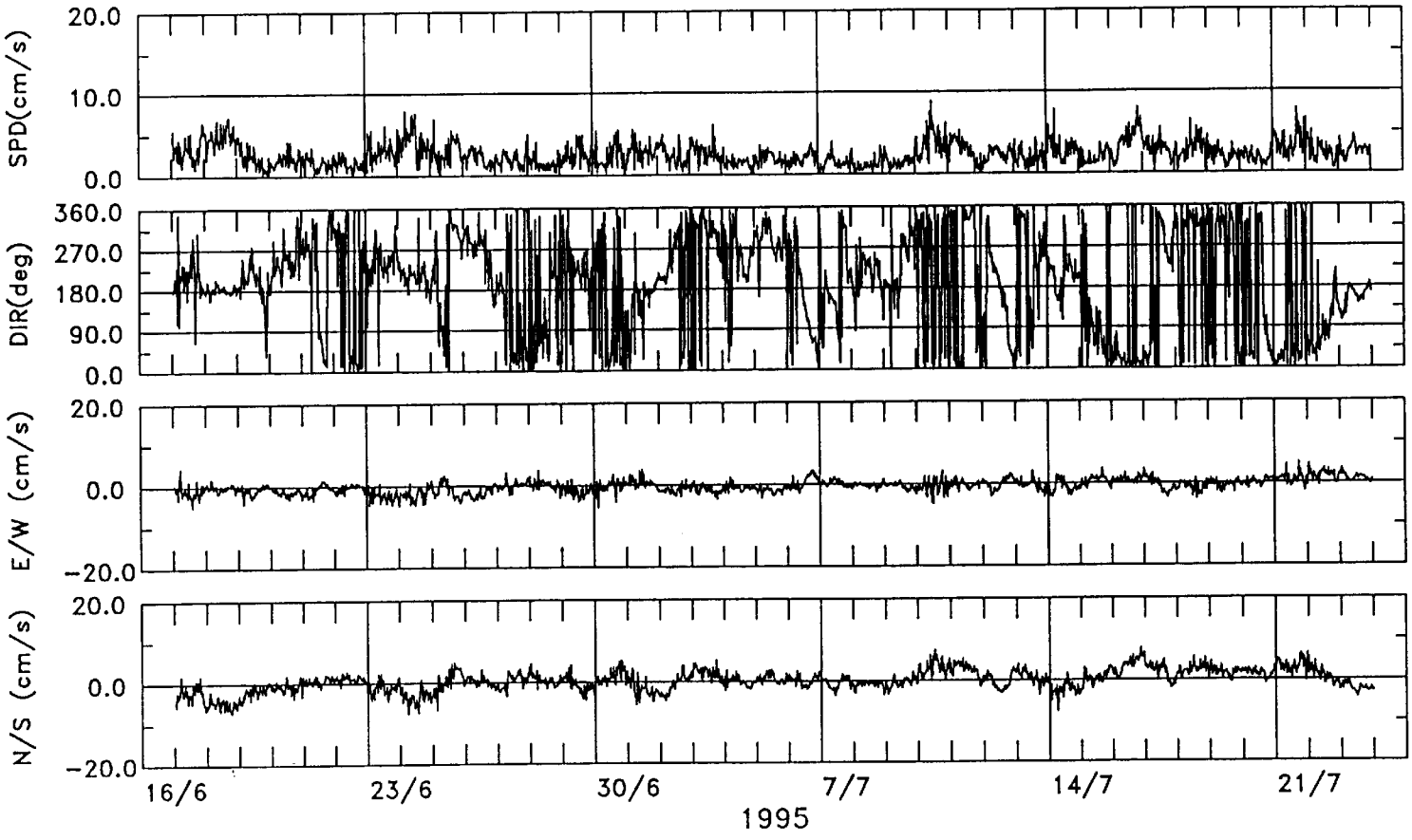
P7 SITE 3. MEASURED SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 - 24/07/95 EST



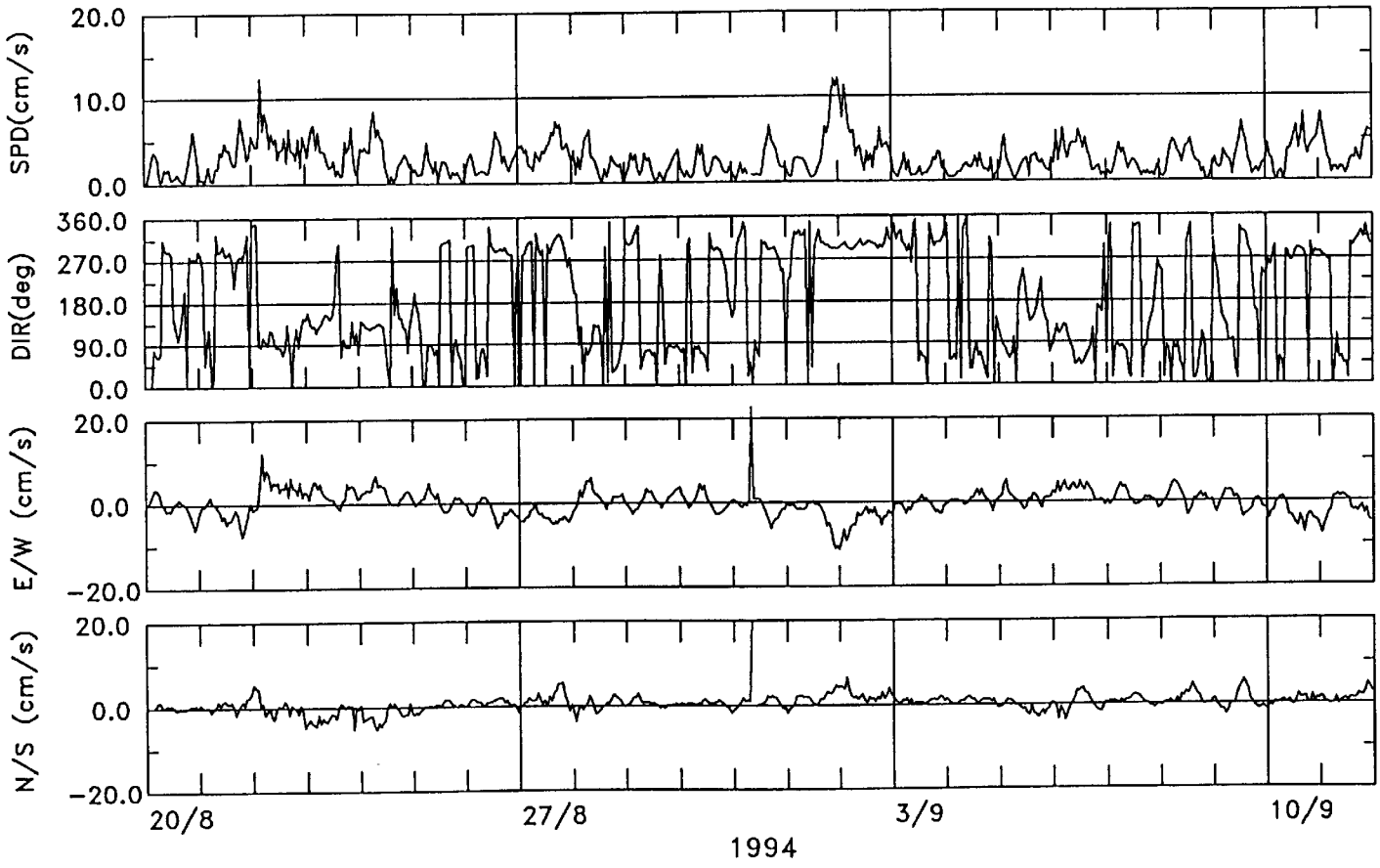
P7 SITE 3. PREDICTED TIDAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 – 24/07/95 EST



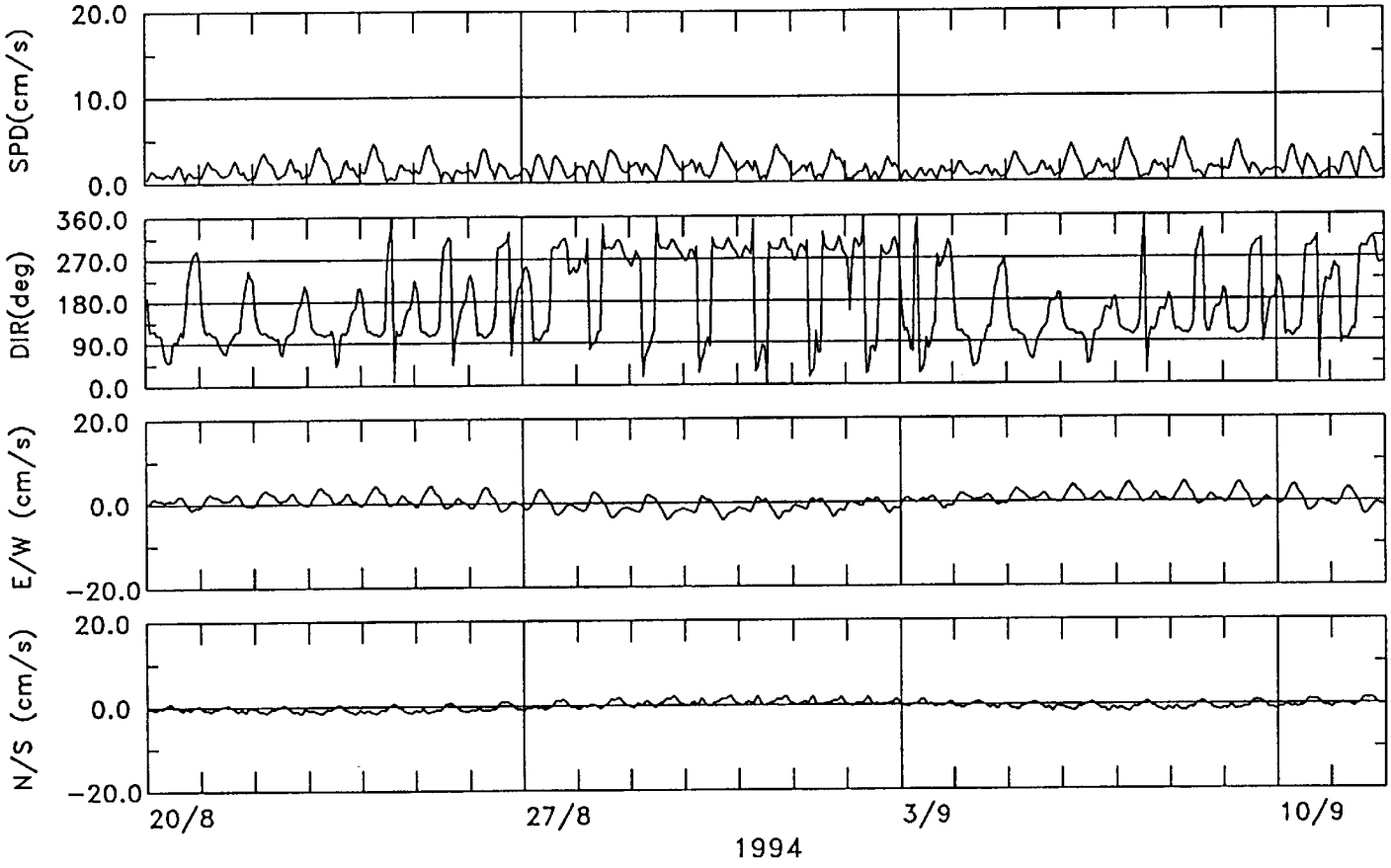
P7 SITE 3. RESIDUAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 - 24/07/95 EST



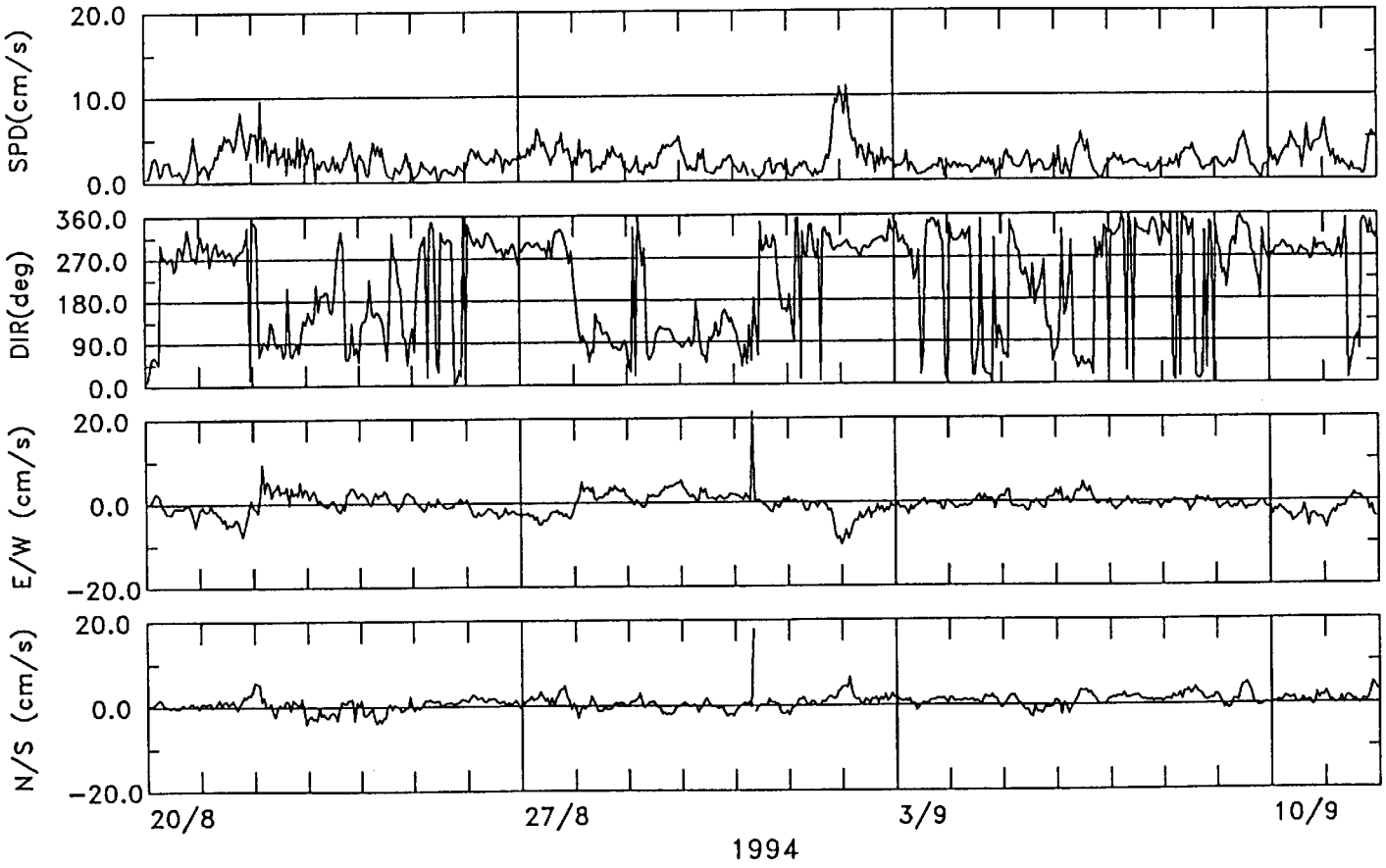
P7 SITE 5. MEASURED SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*4 MINUTE AVERAGE EVERY 60 MINUTES
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 0.25 metres OCEAN DEPTH 14.6 metres
PERIOD 20/08/94 – 12/09/94 EST



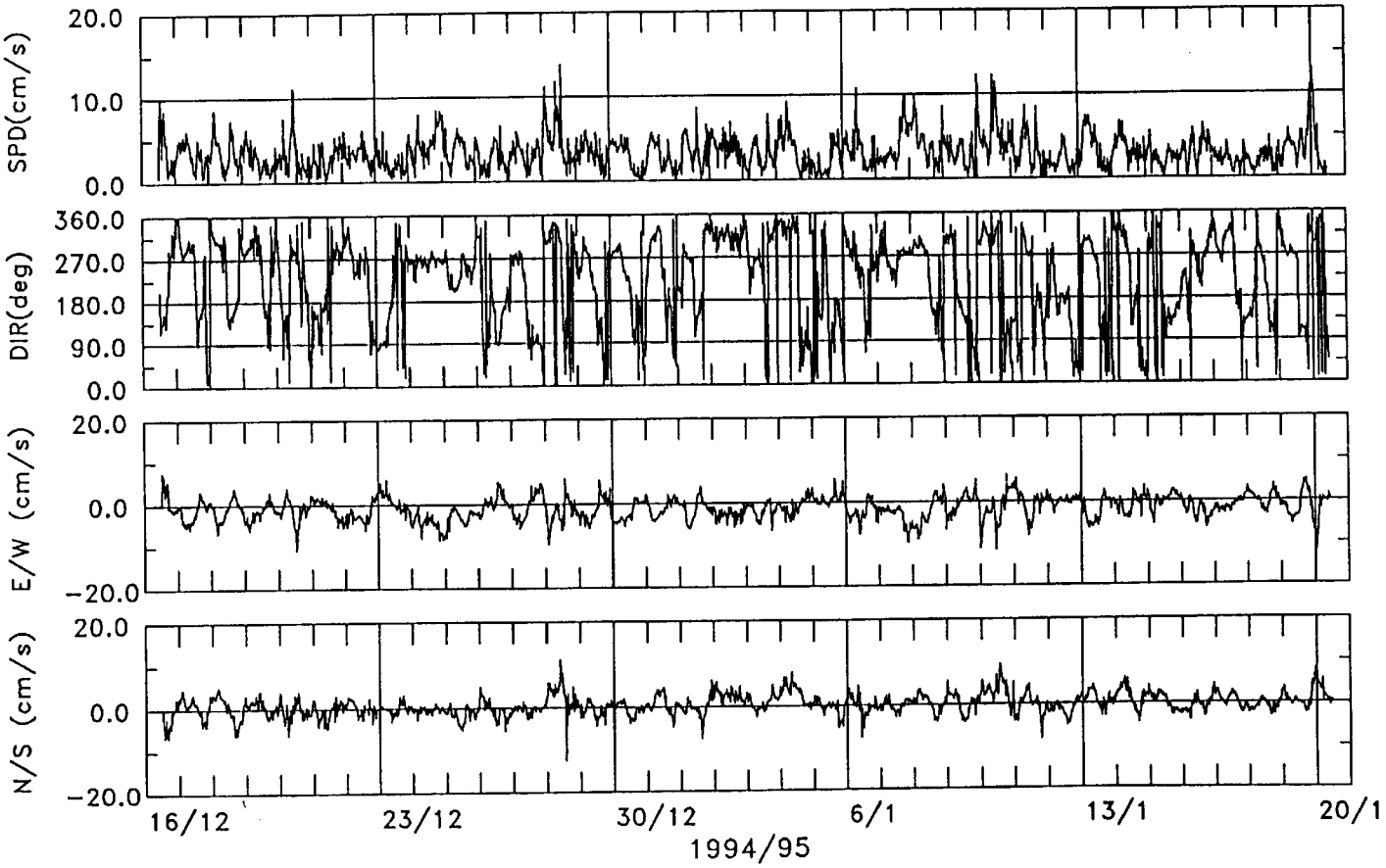
P7 SITE 5. PREDICTED TIDAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*4 MINUTE AVERAGE EVERY 60 MINUTES
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 0.25 metres OCEAN DEPTH 14.6 metres
PERIOD 20/08/94 - 12/09/94 EST



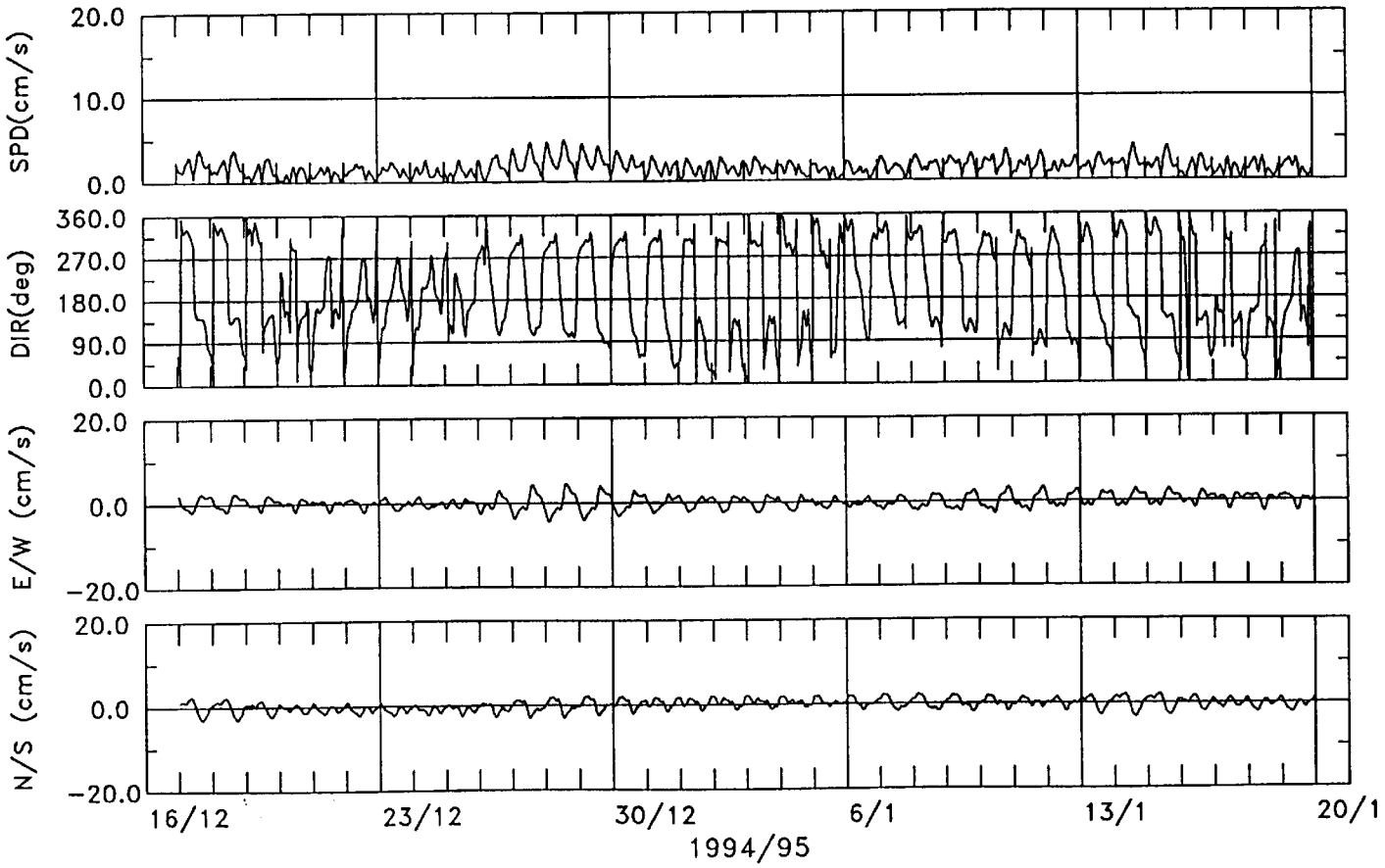
P7 SITE 5. RESIDUAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*4 MINUTE AVERAGE EVERY 60 MINUTES
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 0.25 metres OCEAN DEPTH 14.6 metres
PERIOD 20/08/94 - 12/09/94 EST



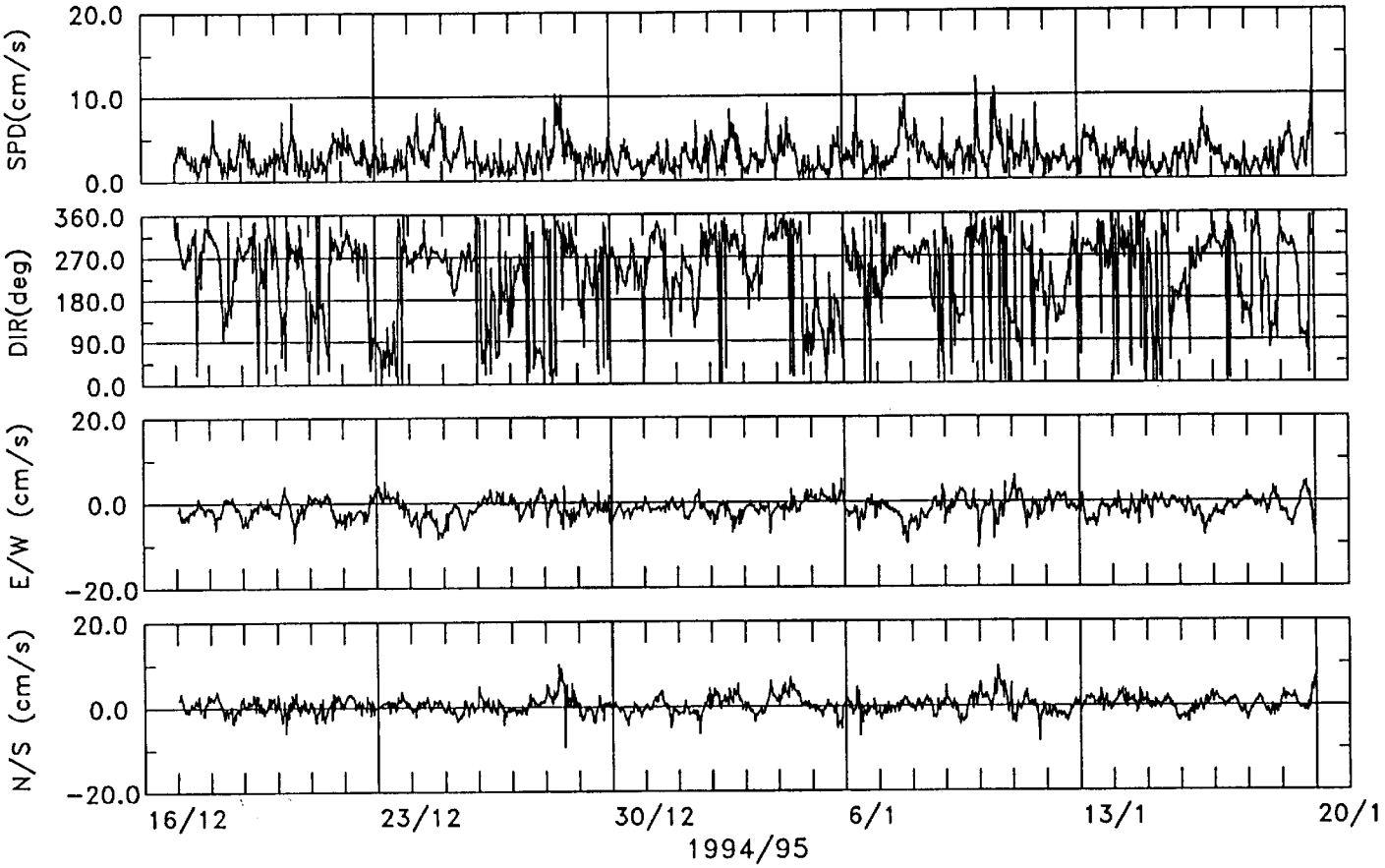
P7 SITE 6. MEASURED SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.5 metres
PERIOD 16/12/94 - 20/01/95 EST



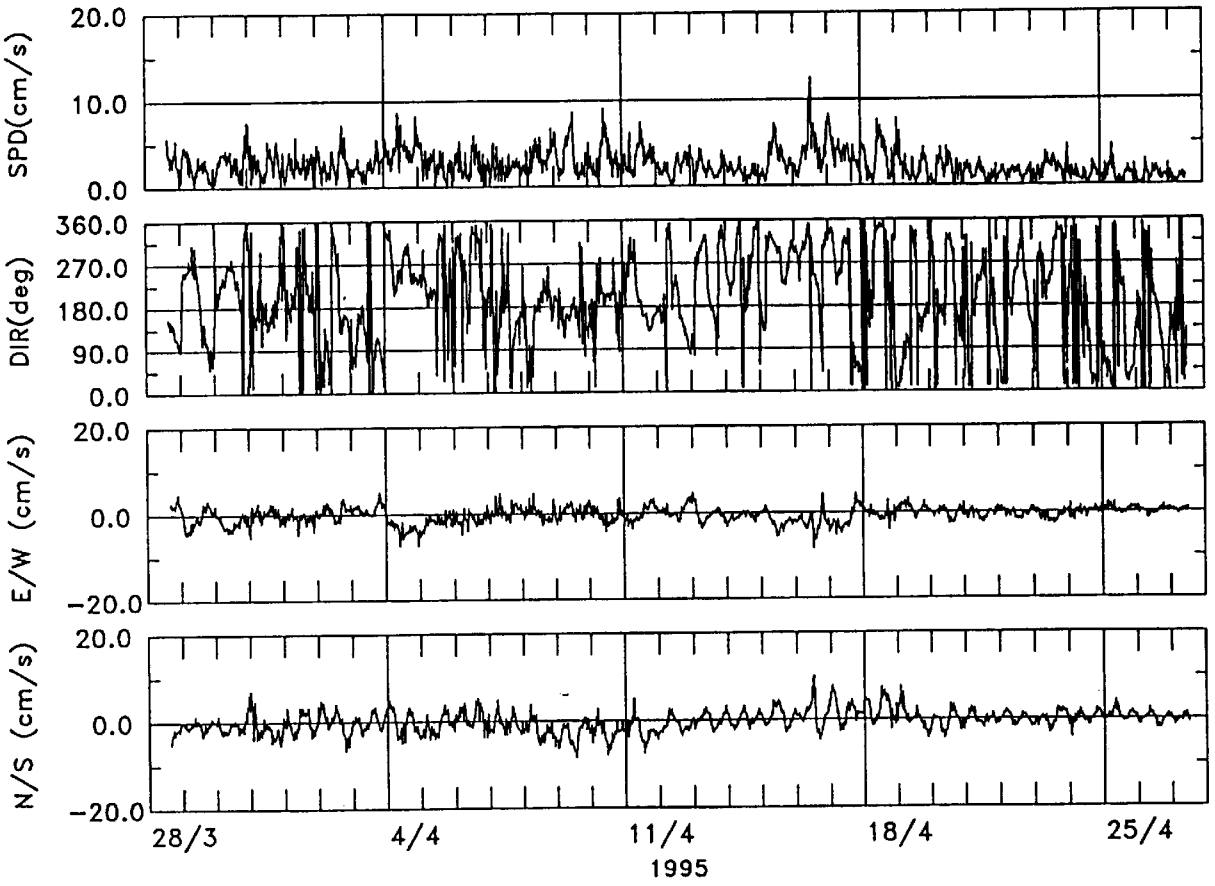
P7 SITE 6. PREDICTED TIDAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.5 metres
PERIOD 17/12/94 - 20/01/95 EST



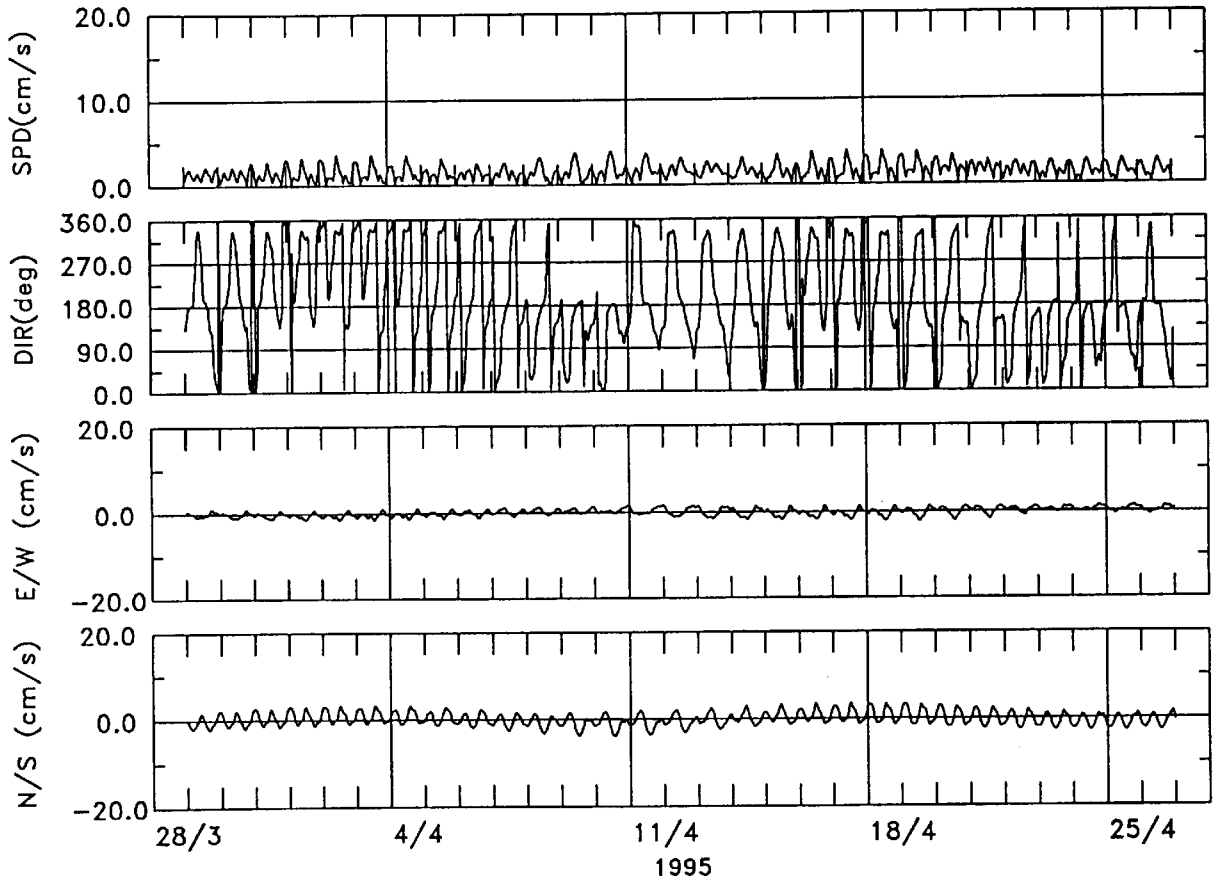
P7 SITE 6. RESIDUAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.5 metres
PERIOD 16/12/94 - 20/01/95 EST



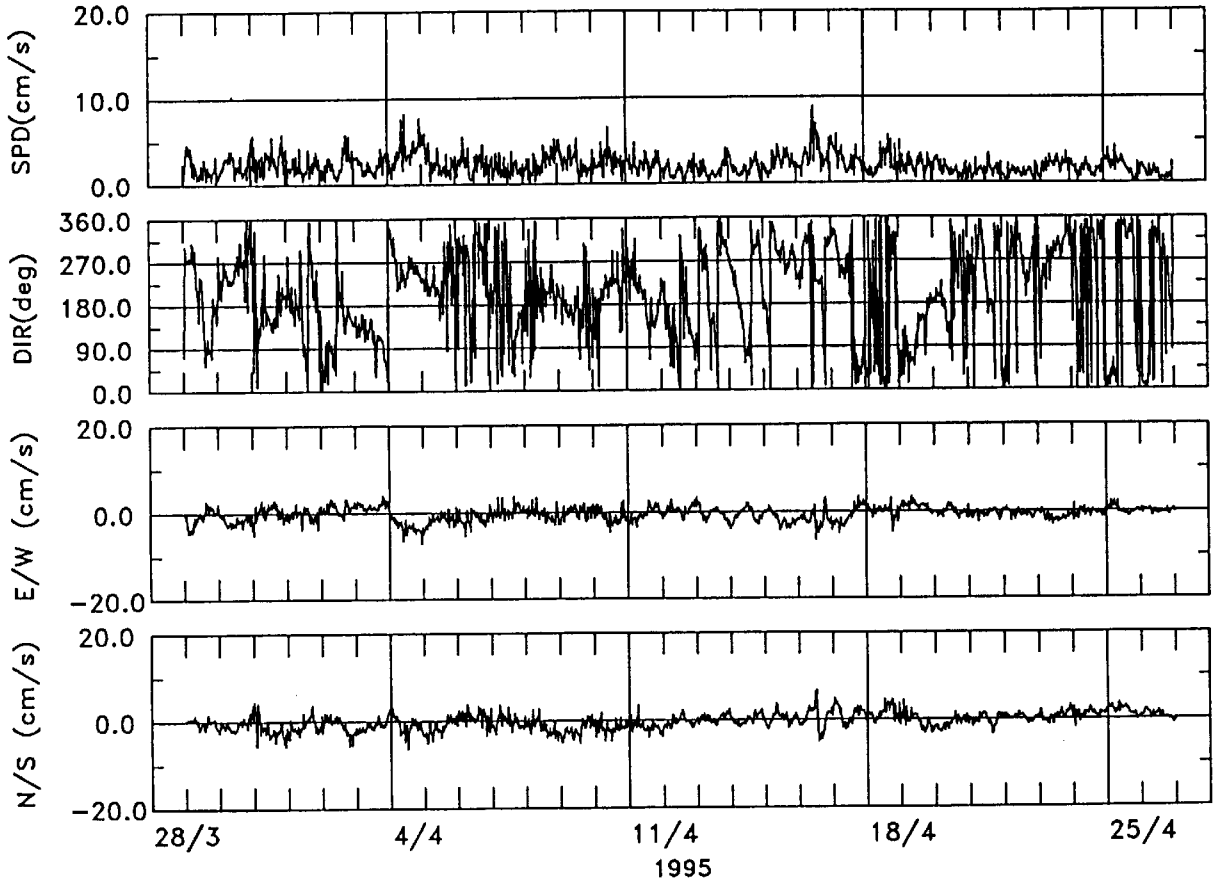
P7 SITE 7. MEASURED SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 0.31 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/95 - 27/04/95 EST



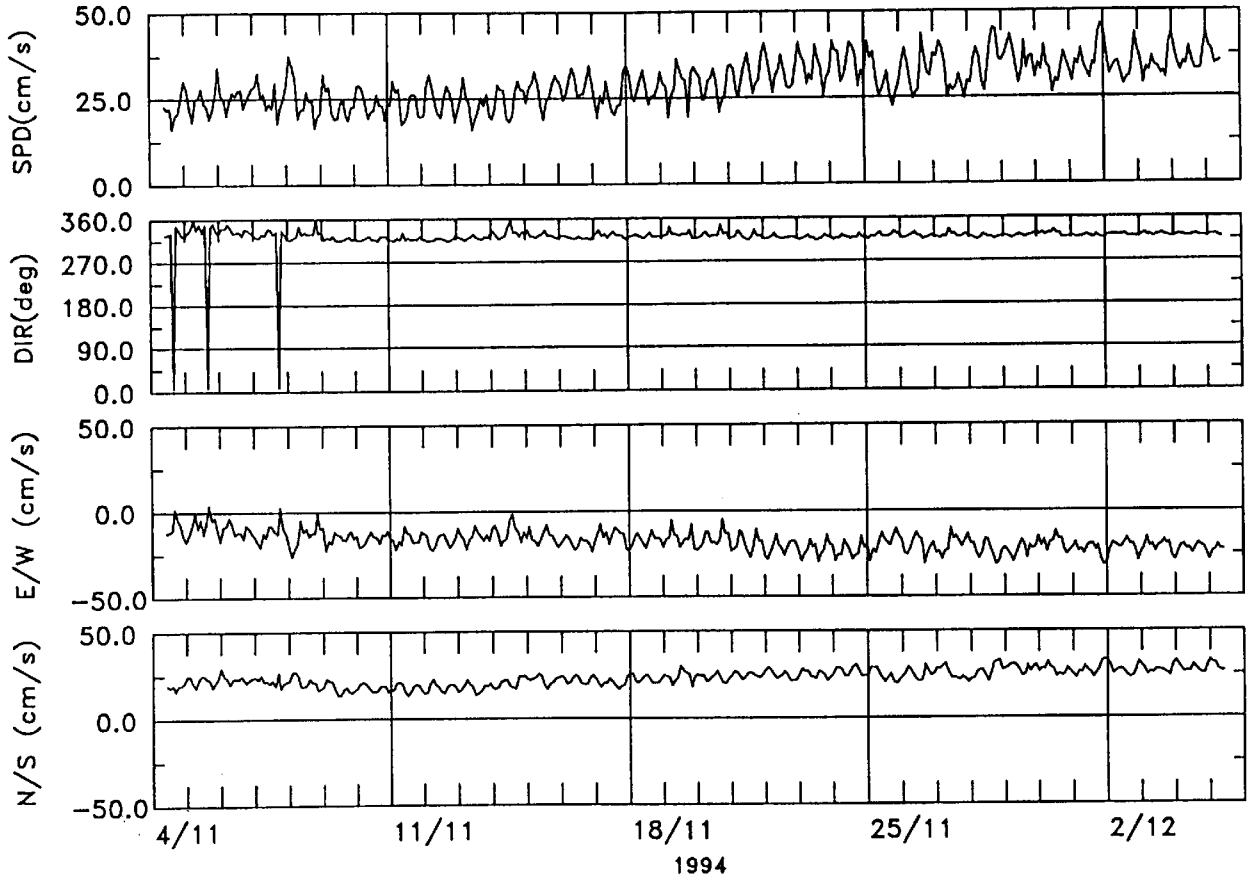
P7 SITE 7. PREDICTED TIDAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 0.31 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/95 - 27/04/95 EST



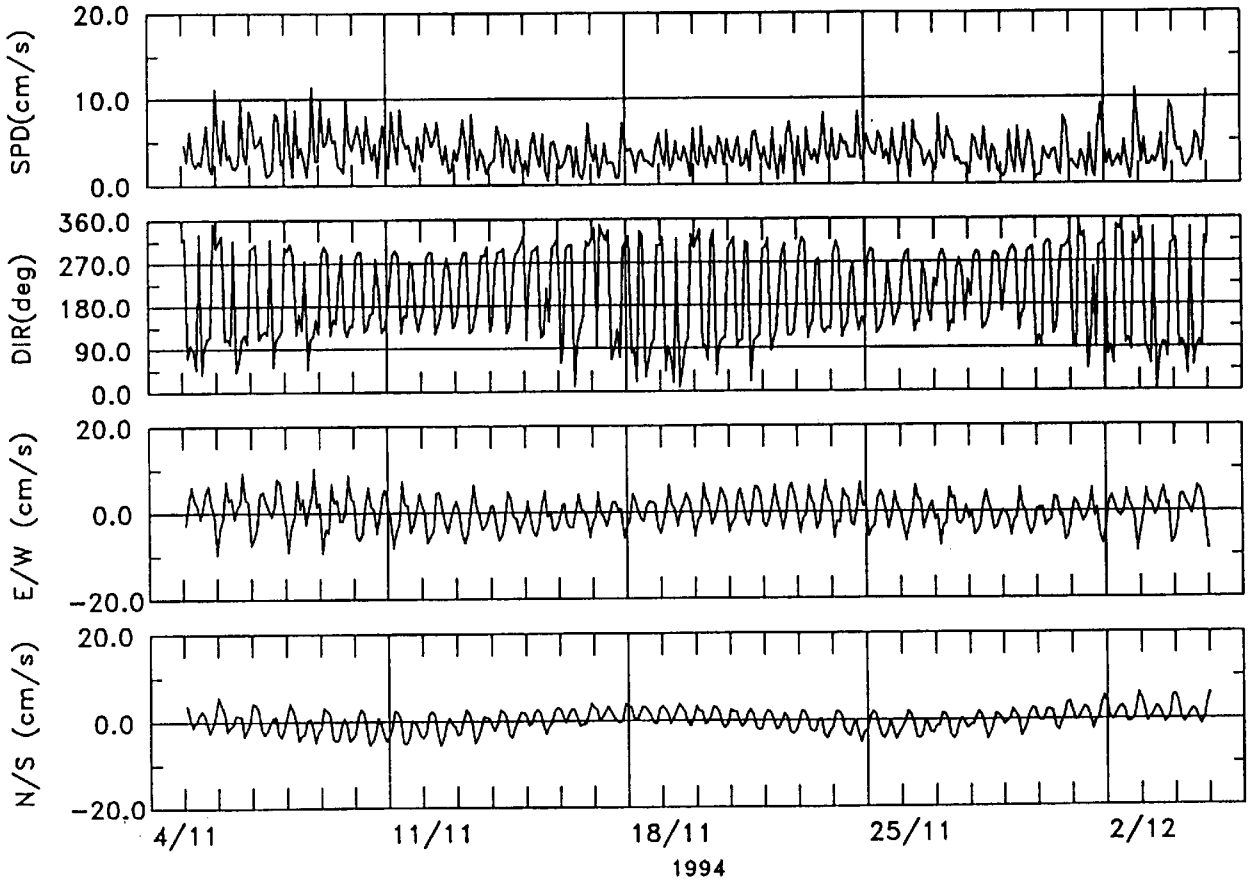
P7 SITE 7. RESIDUAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 0.31 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/95 - 27/04/95 EST



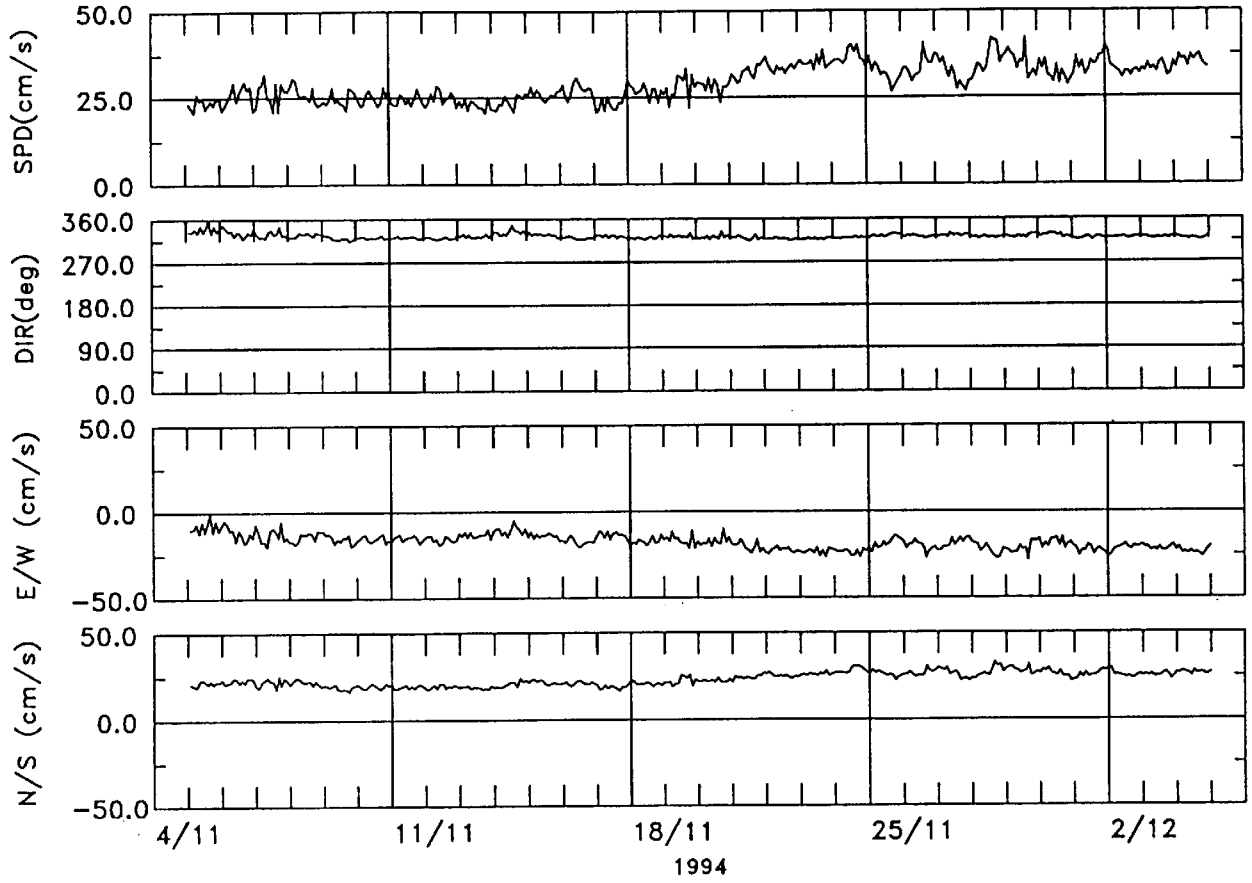
P7 SITE 8. MEASURED SPEEDS AND VELOCITIES
S4 METER 4910997. 180*2 SECOND AVERAGES/BURST. BURST, SRB EVERY 120 MINUTES
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 0.50 metres OCEAN DEPTH 5.1 metres
PERIOD 4/11/94 - 5/12/94 EST



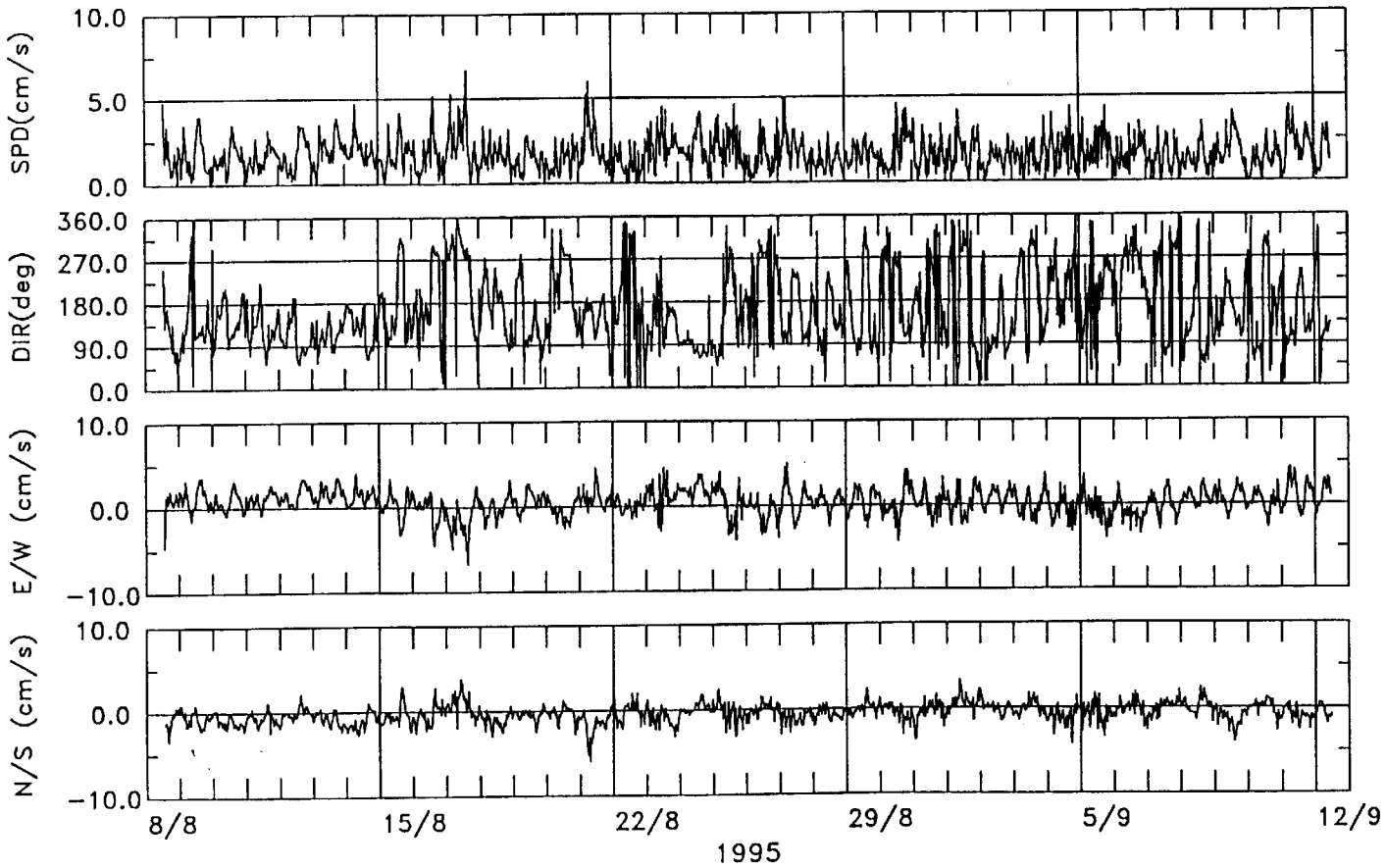
P7 SITE 8. PREDICTED TIDAL SPEEDS AND VELOCITIES
S4 METER 4910997. 180*2 SECOND AVERAGES/BURST. BURST, SRB EVERY 120 MINUTES
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 0.50 metres OCEAN DEPTH 5.1 metres
PERIOD 05/11/94 - 05/12/94 EST



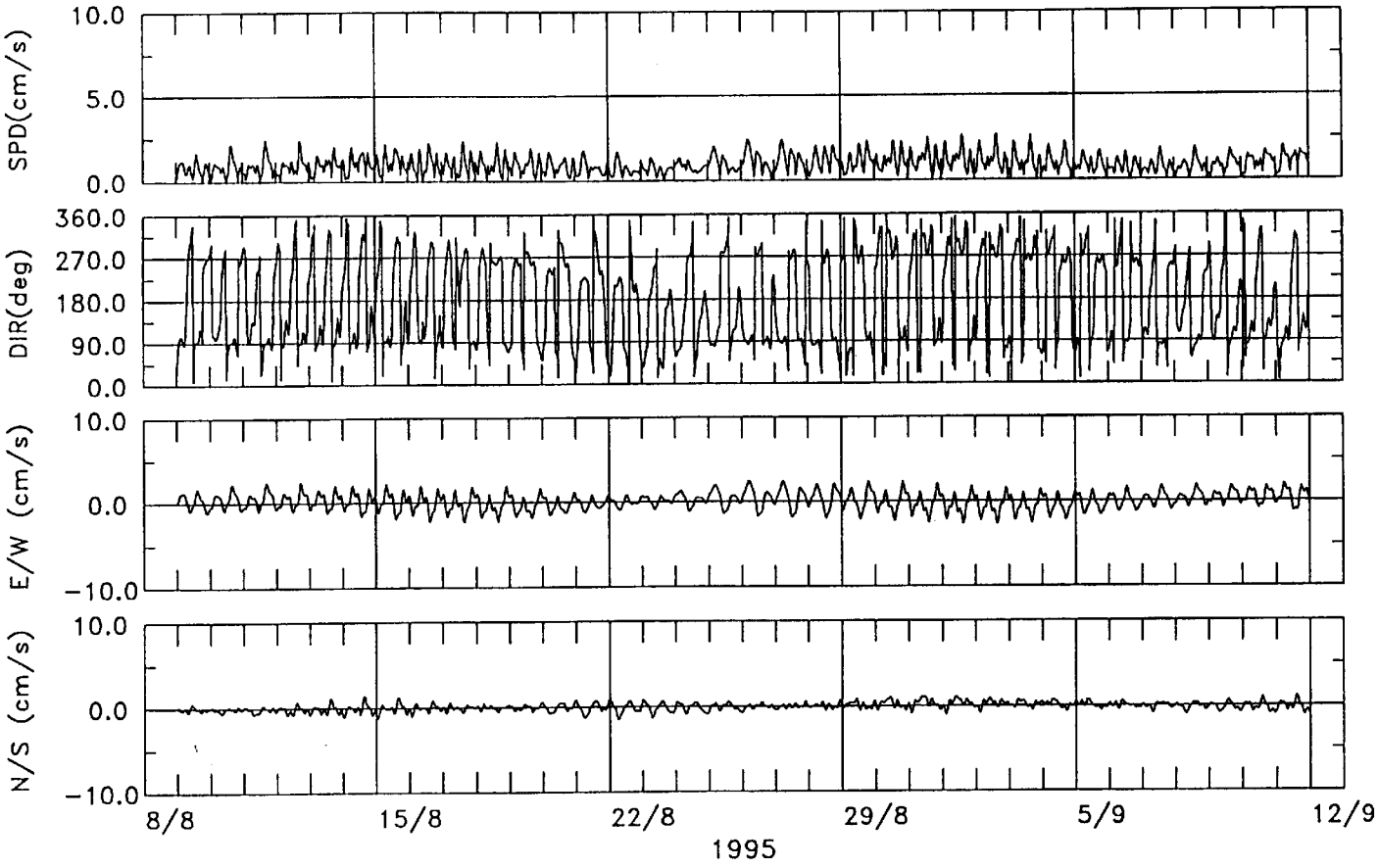
P7 SITE 8. RESIDUAL TIDAL SPEEDS AND VELOCITIES
S4 METER 4910997. 180*2 SECOND AVERAGES/BURST. BURST, SRB EVERY 120 MINUTES
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 0.50 metres OCEAN DEPTH 5.1 metres
PERIOD 05/11/94 - 05/12/94 EST



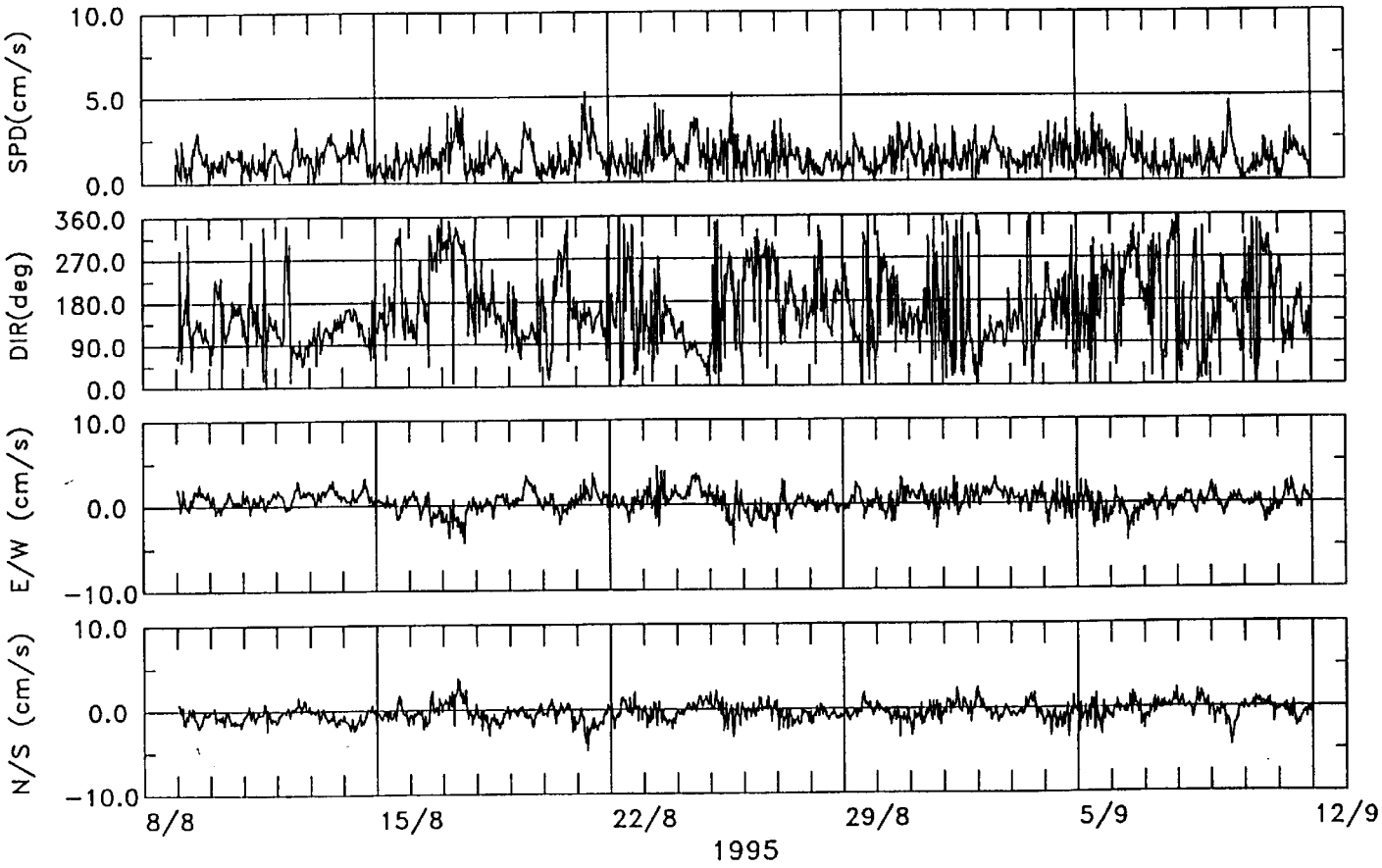
P7 SITE 9. MEASURED SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 - 12/09/95 EST



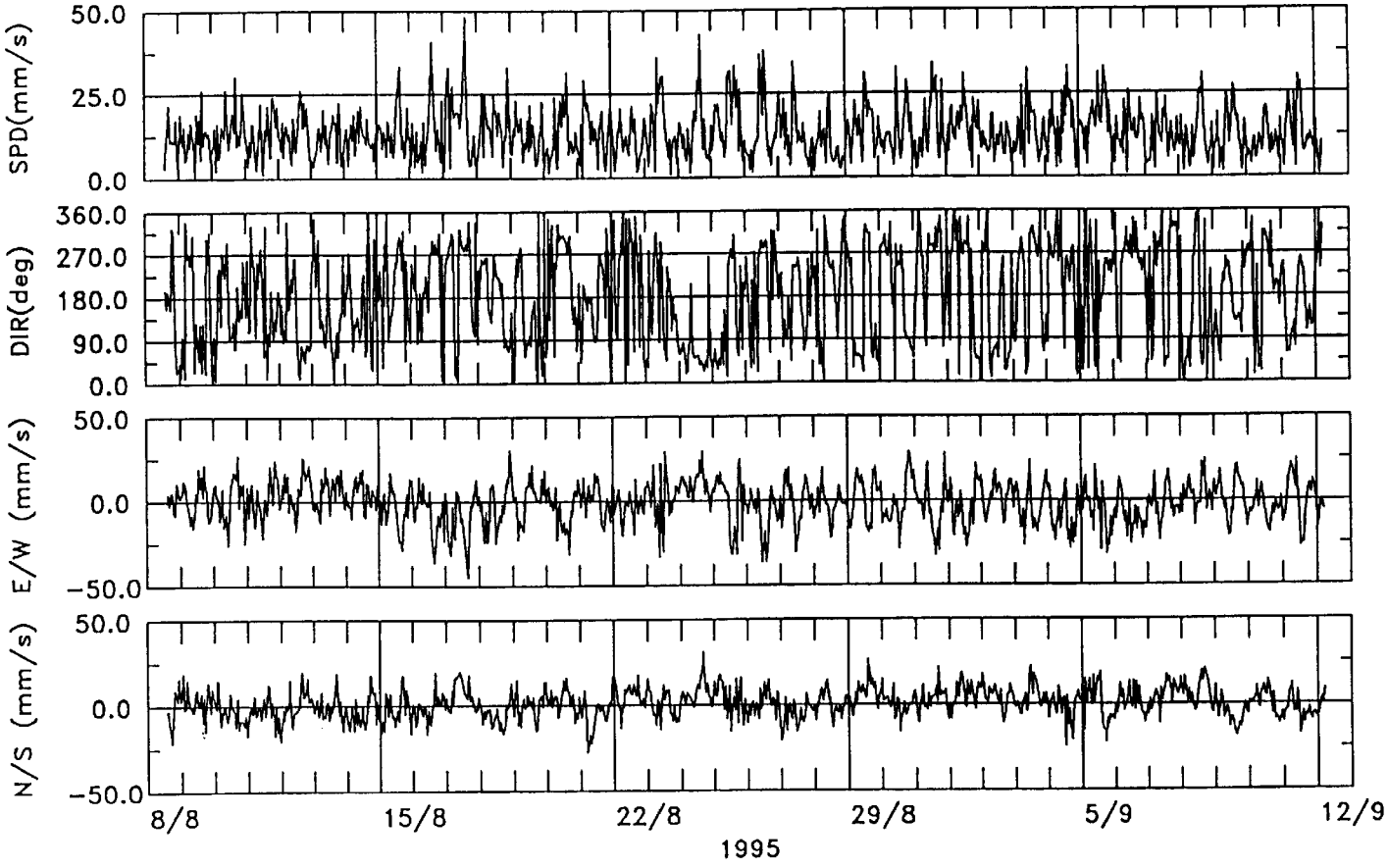
P7 SITE 9. PREDICTED TIDAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.3 metres
PERIOD 9/08/95 - 12/09/95 EST



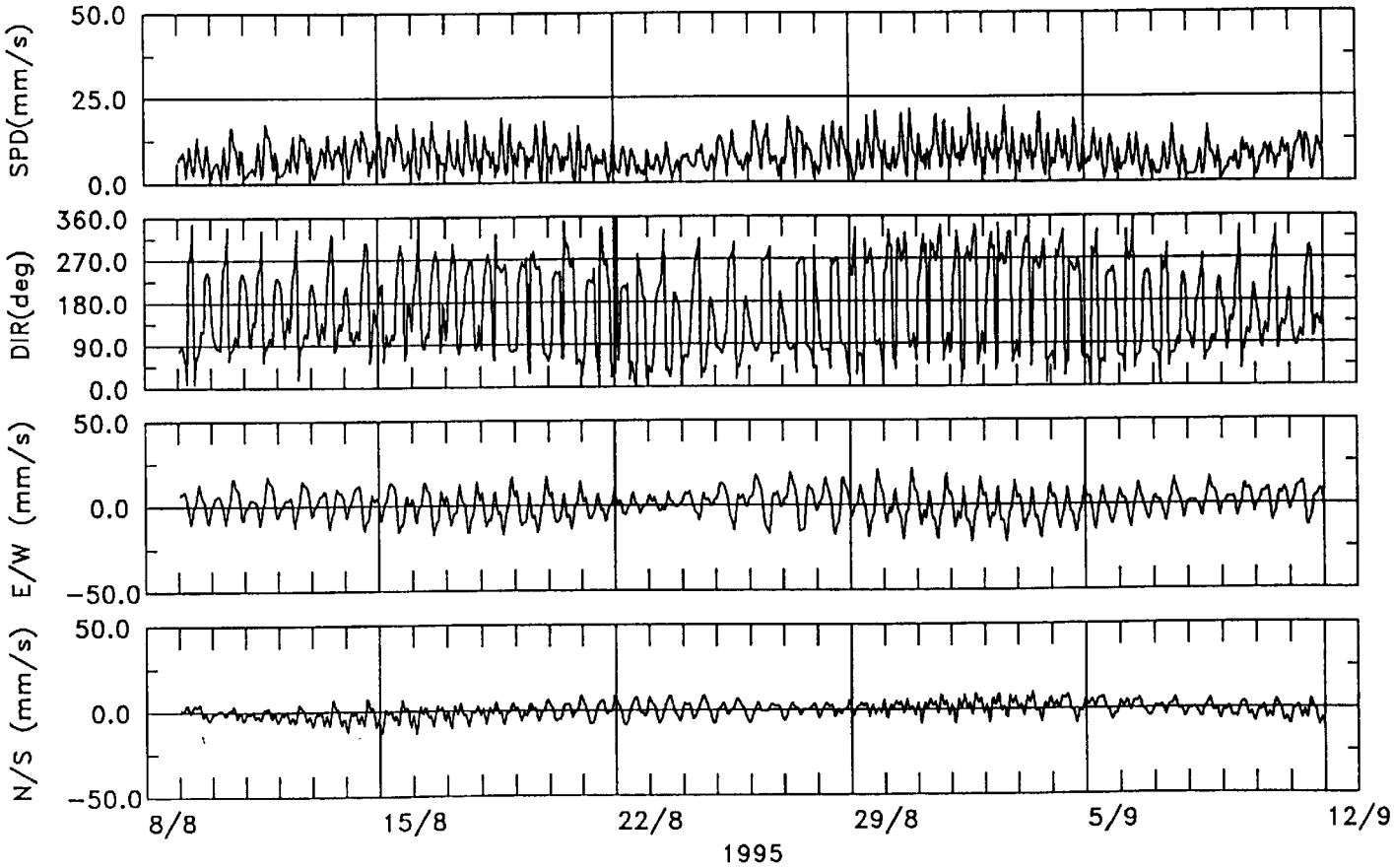
P7 SITE 9. RESIDUAL SPEEDS AND VELOCITIES
NEIL BROWN METER 52. 1*2 MINUTE AVERAGE EVERY 30 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.3 metres
PERIOD 9/08/95 – 12/09/95 EST



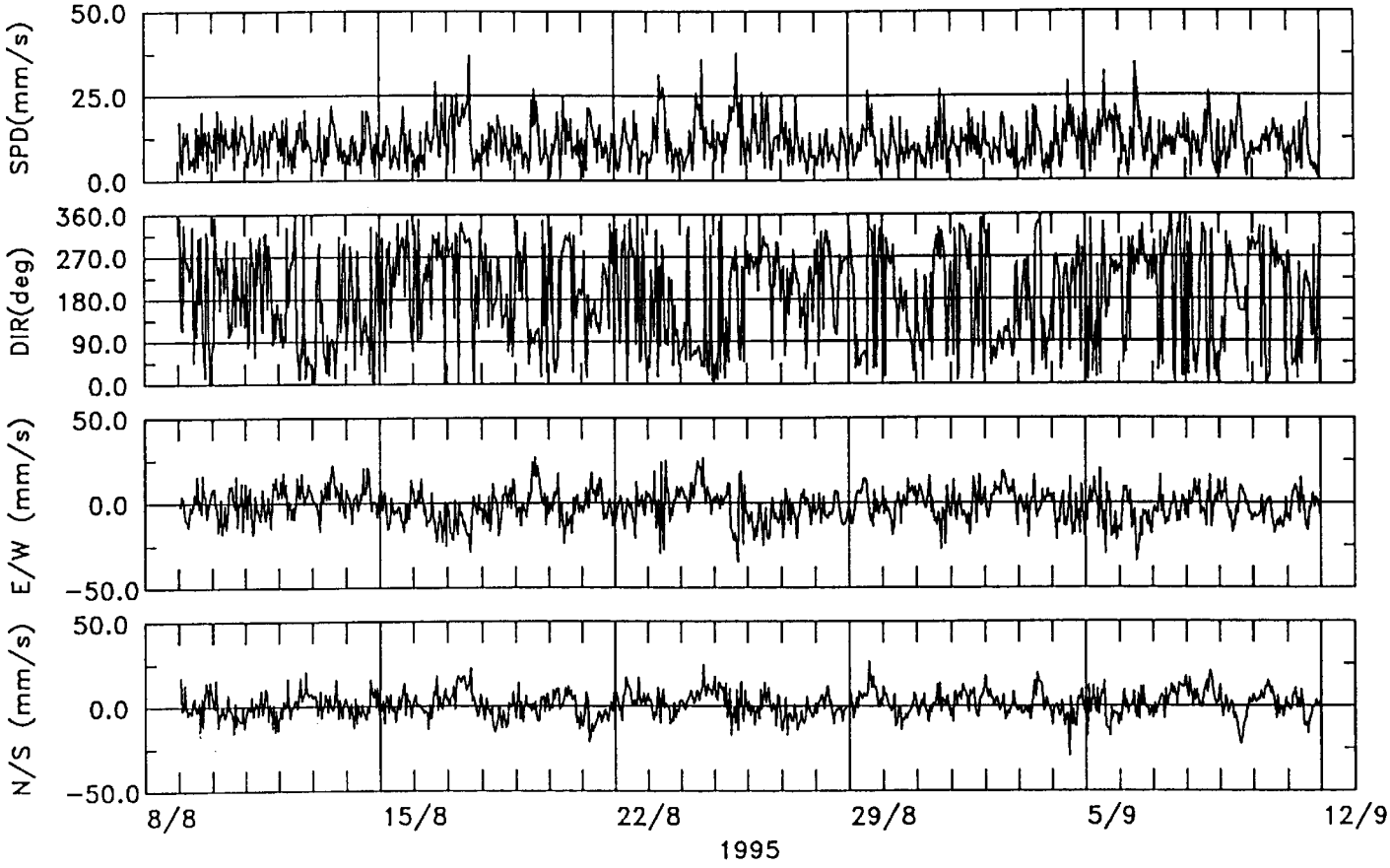
P7 SITE 9. MEASURED SPEEDS AND VELOCITIES
ACOUSTIC DOPPLER VELOCIMETER. 1*100 SECOND 5 HERTZ BURST EVERY 60 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E) CORRECTED DIRECTIONS
INSTRUMENT HEIGHT ABOVE BED 0.19 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 – 12/09/95 EST



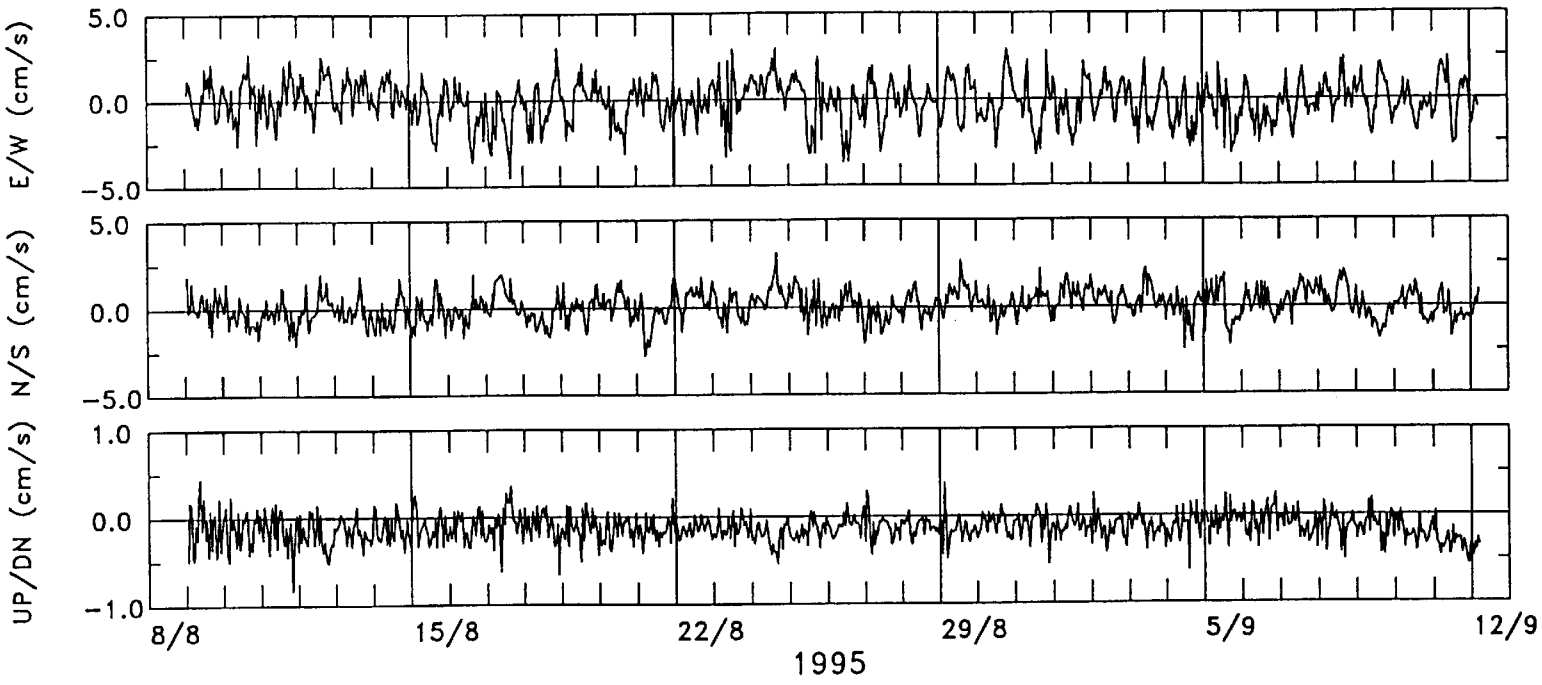
P7 SITE 9. PREDICTED TIDAL SPEEDS AND VELOCITIES
ACOUSTIC DOPPLER VELOCIMETER. 1*100 SECOND 5 HERTZ BURST EVERY 60 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E) CORRECTED DIRECTIONS
INSTRUMENT HEIGHT ABOVE BED 0.19 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 – 12/09/95 EST



P7 SITE 9. RESIDUAL SPEEDS AND VELOCITIES
ACOUSTIC DOPPLER VELOCIMETER. 1*100 SECOND 5 HERTZ BURST EVERY 60 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E) CORRECTED DIRECTIONS
INSTRUMENT HEIGHT ABOVE BED 0.19 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 - 12/09/95 EST



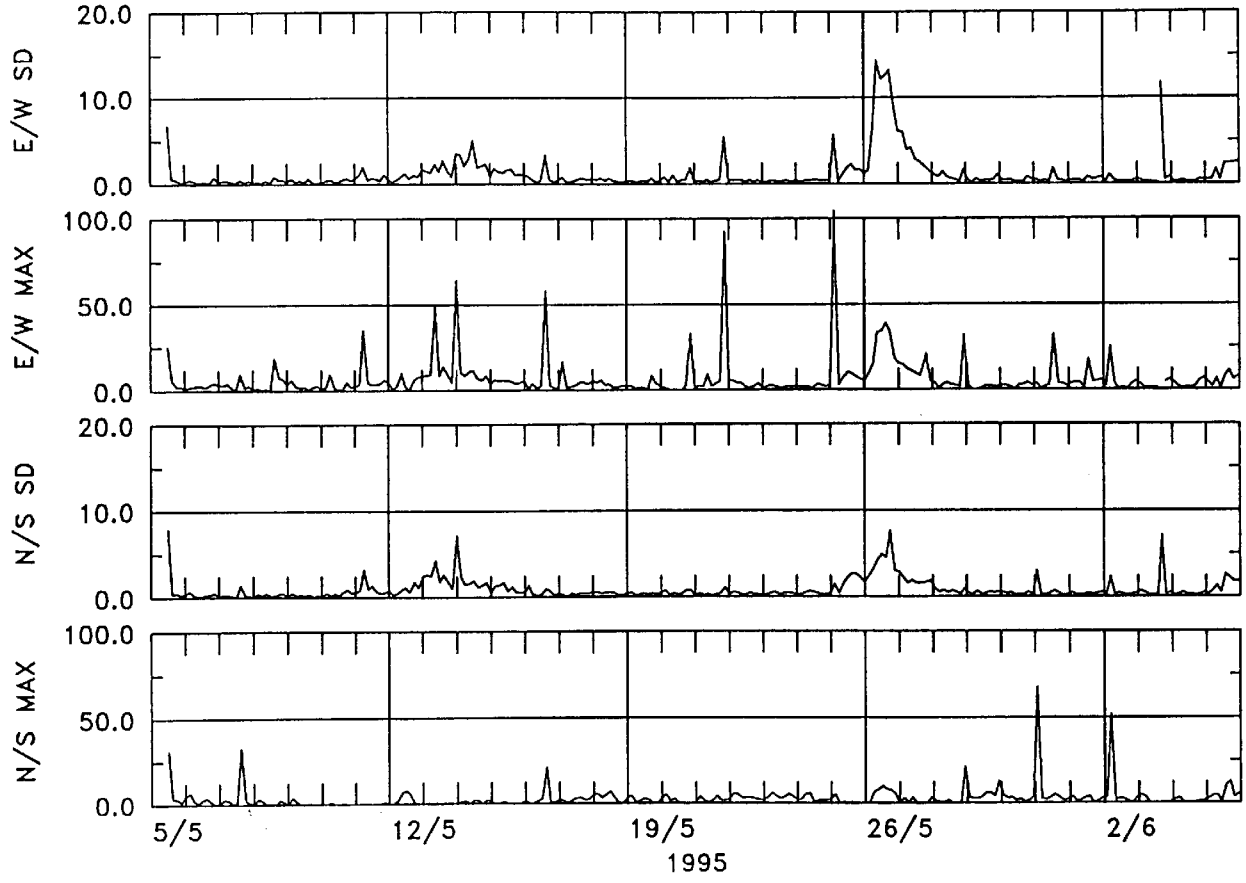
P7 SITE 9. MEAN VELOCITIES
ACOUSTIC DOPPLER VELOCIMETER. 1*100 SECOND AVERAGE EVERY 60 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.19 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 – 12/09/95 EST



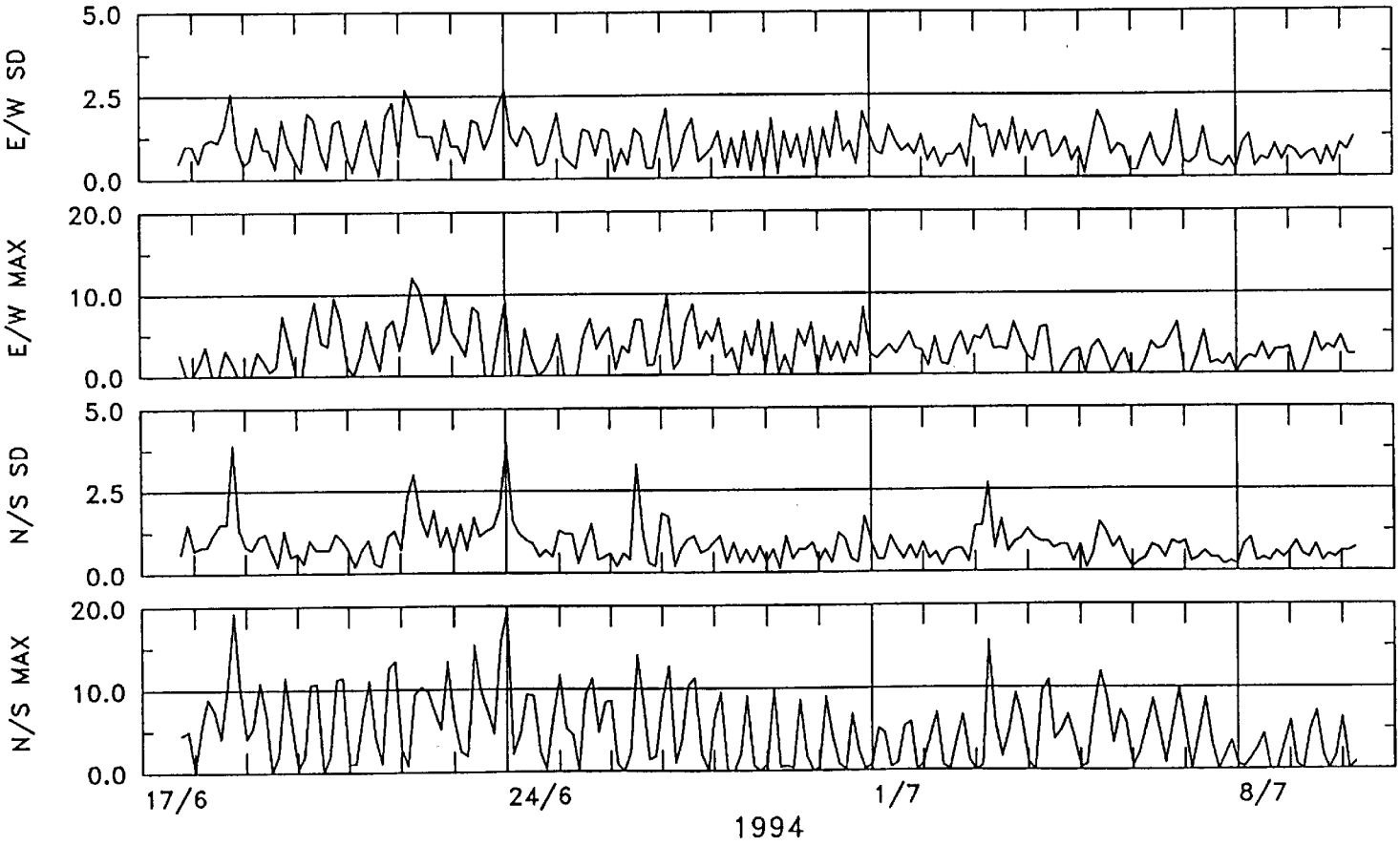
6.2. Appendix 2 - Wave-induced velocity measurements

Measurements of wave-induced velocities were taken using Neil Brown SACM-3, InterOcean S4 and SonTek ADV current meters.

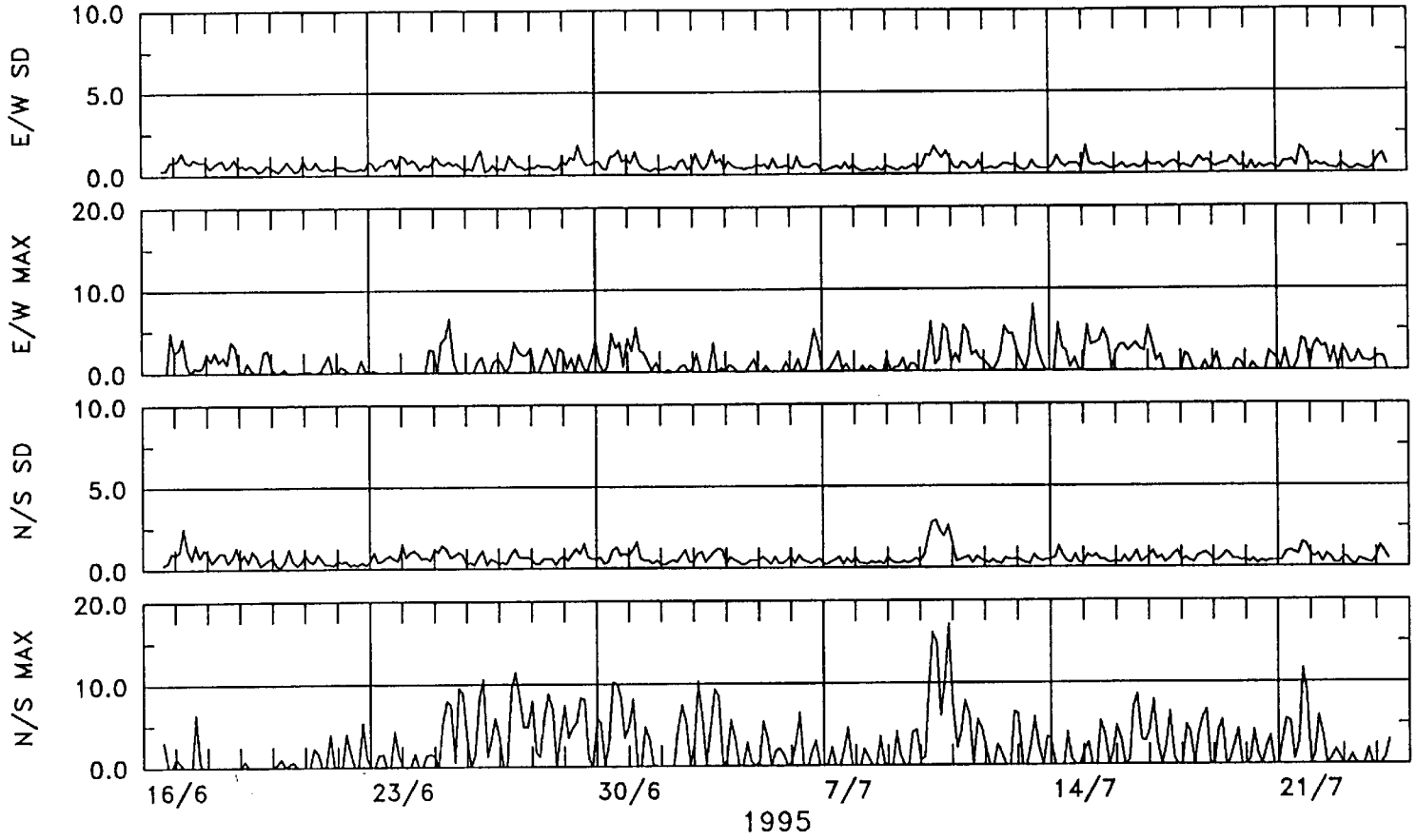
P7 SITE 1. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
NEIL BROWN METER 52. 480*0.5 SECOND AVERAGES EVERY 180 MINUTES
POSITION 38° 4.502'(S) 145° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 – 5/06/95 EST



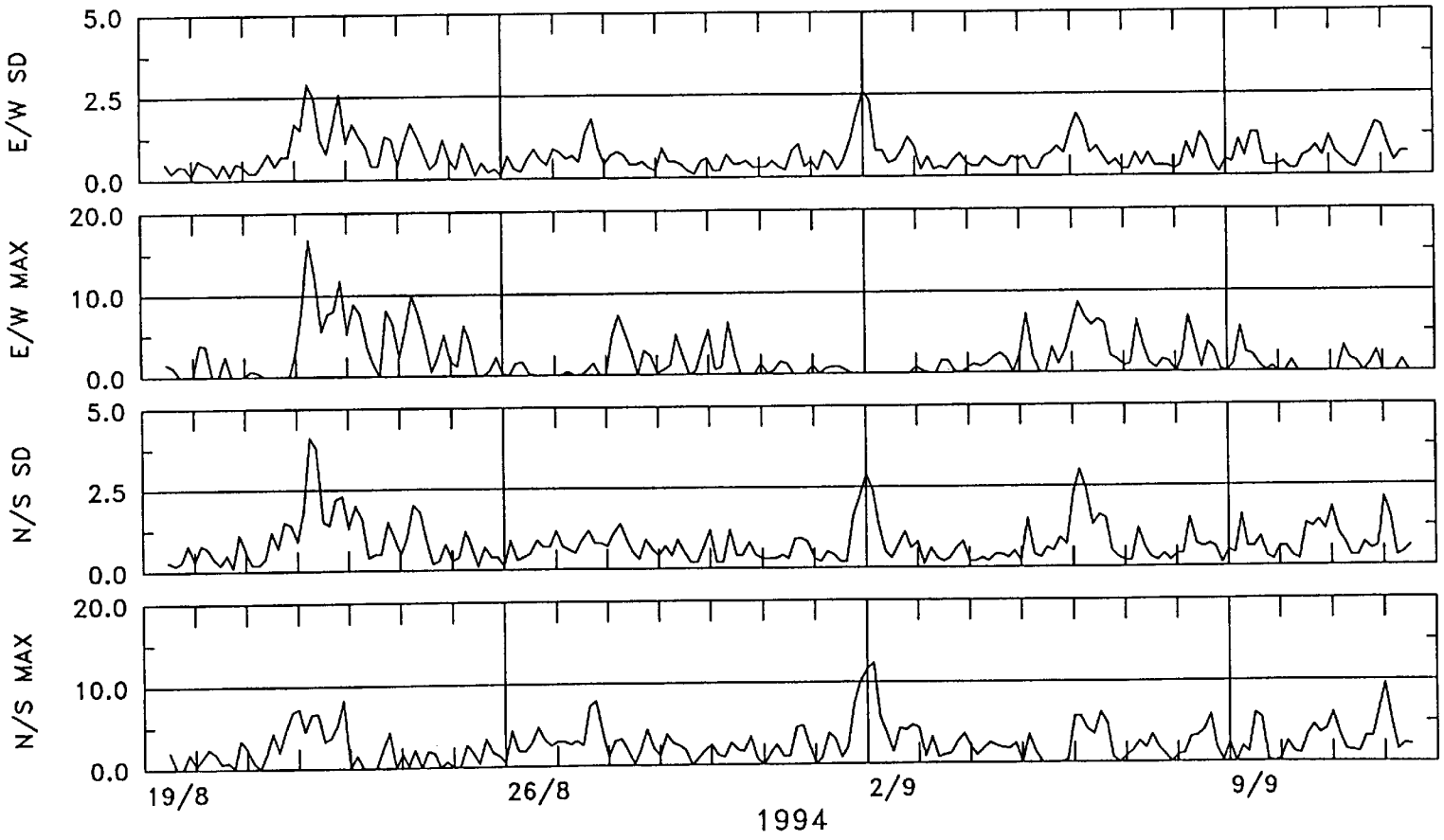
P7 SITE 2. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
NEIL BROWN METER 52. 480*0.5 SECOND AVERAGES EVERY 3 HOURS
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 0.3 metres OCEAN DEPTH 23.6 metres
PERIOD 17/06/94 – 10/07/94 EST



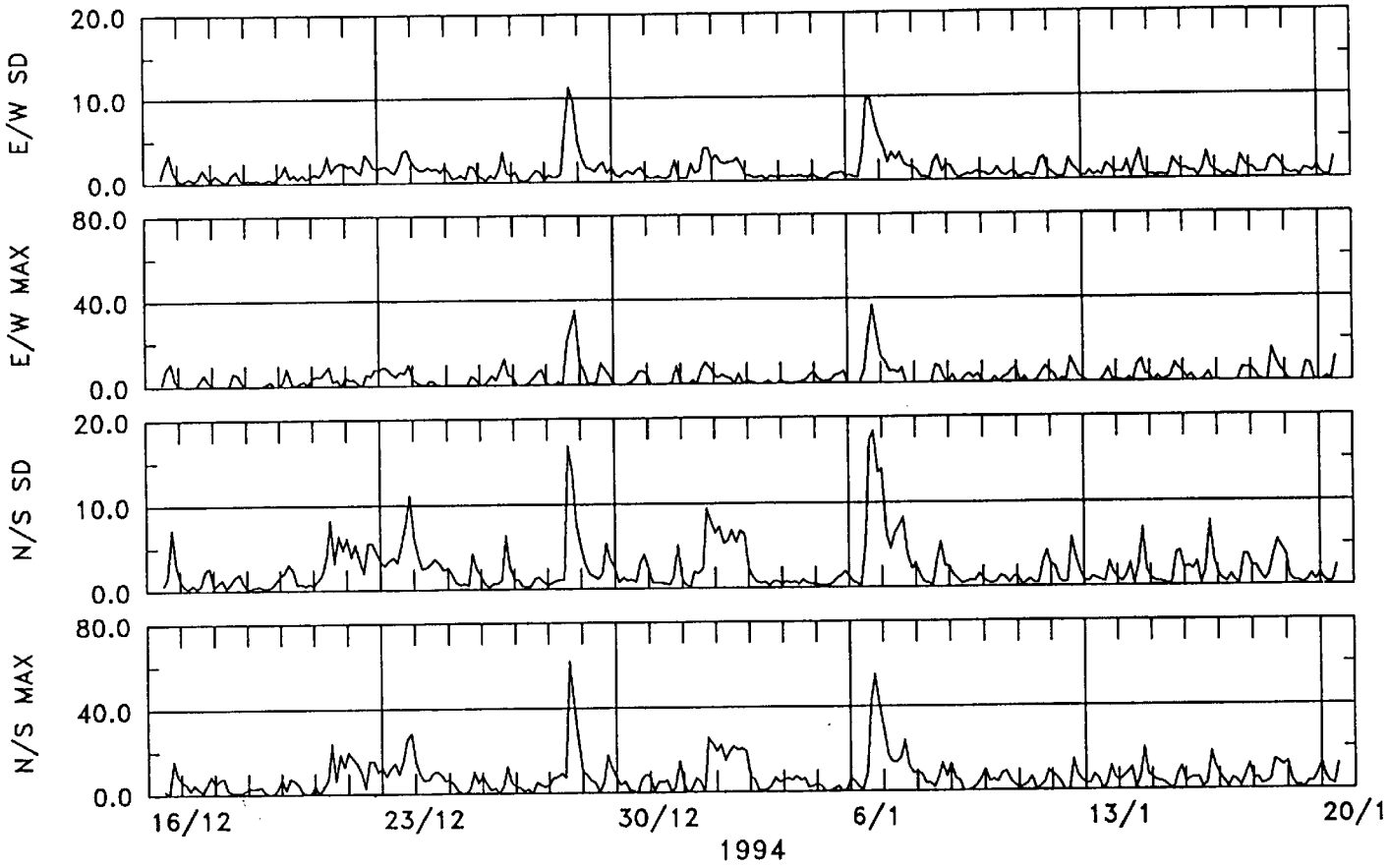
P7 SITE 3. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
NEIL BROWN METER 52. 480*0.5 SECOND AVERAGES EVERY 180 MINUTES
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 – 24/07/95 EST



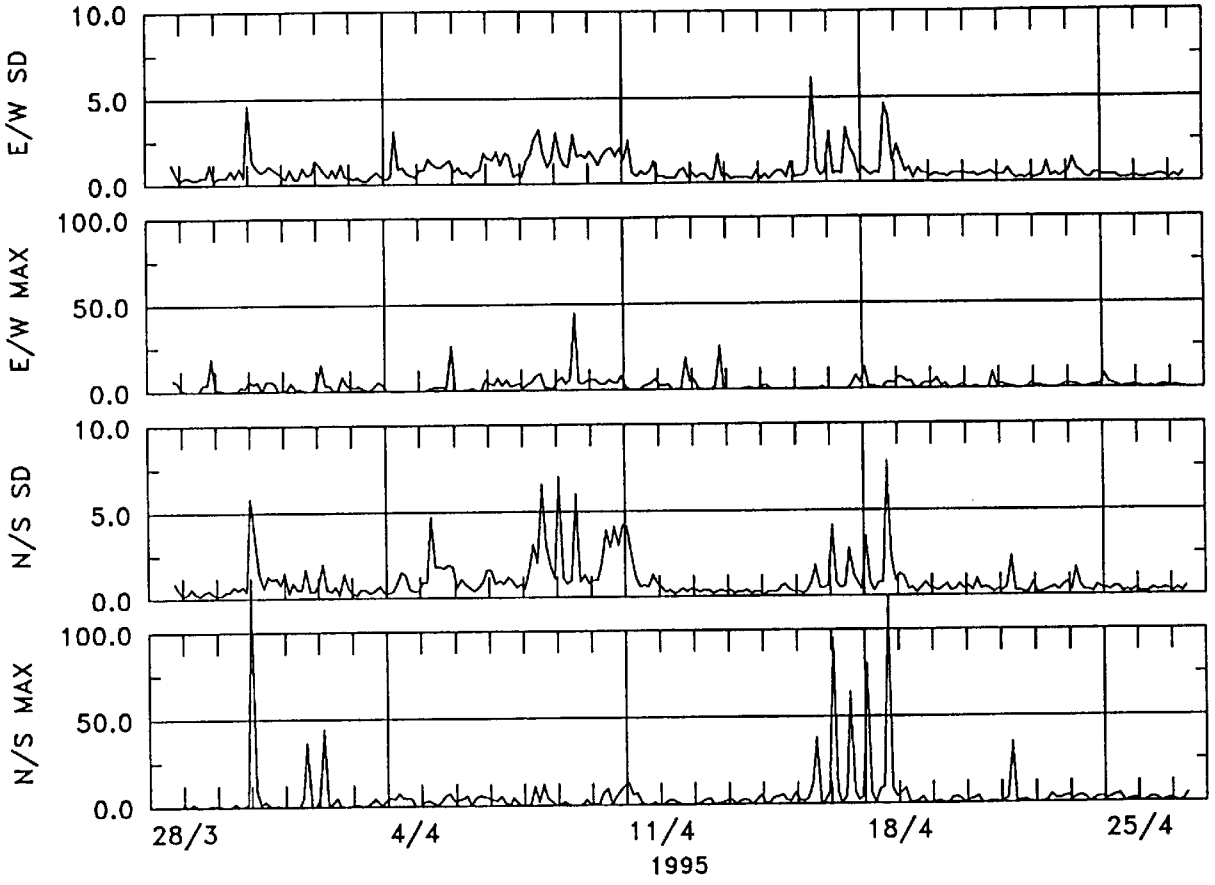
P7 SITE 5. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
NEIL BROWN METER 52. 240*0.5 SECOND AVERAGES EVERY 3 HOURS
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 0.25 metres OCEAN DEPTH 14.6 metres
PERIOD 19/08/94 - 12/09/94 EST



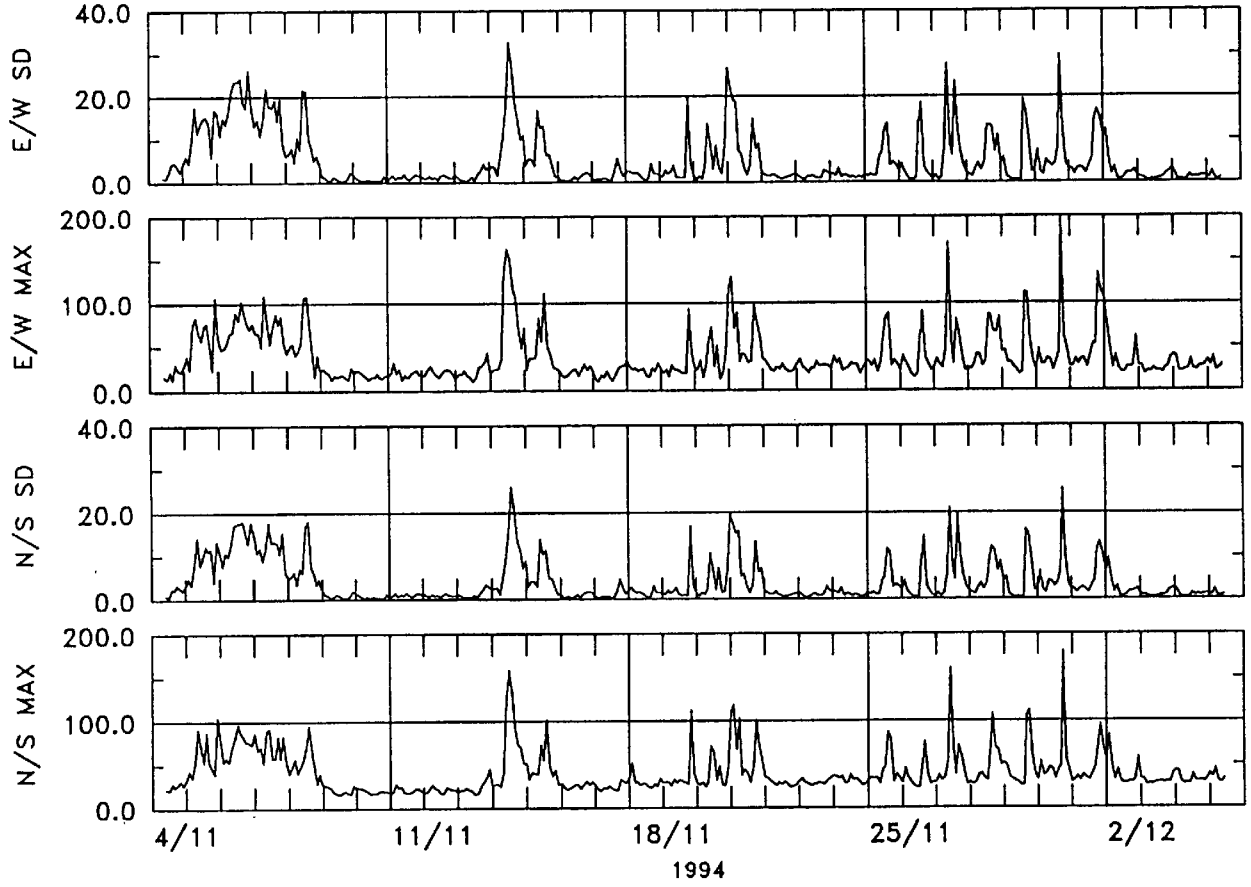
P7 SITE 6. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
NEIL BROWN METER 52. 480*0.5 SECOND AVERAGES EVERY 180 MINUTES
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.5 metres
PERIOD 16/12/94 - 20/01/95 EST



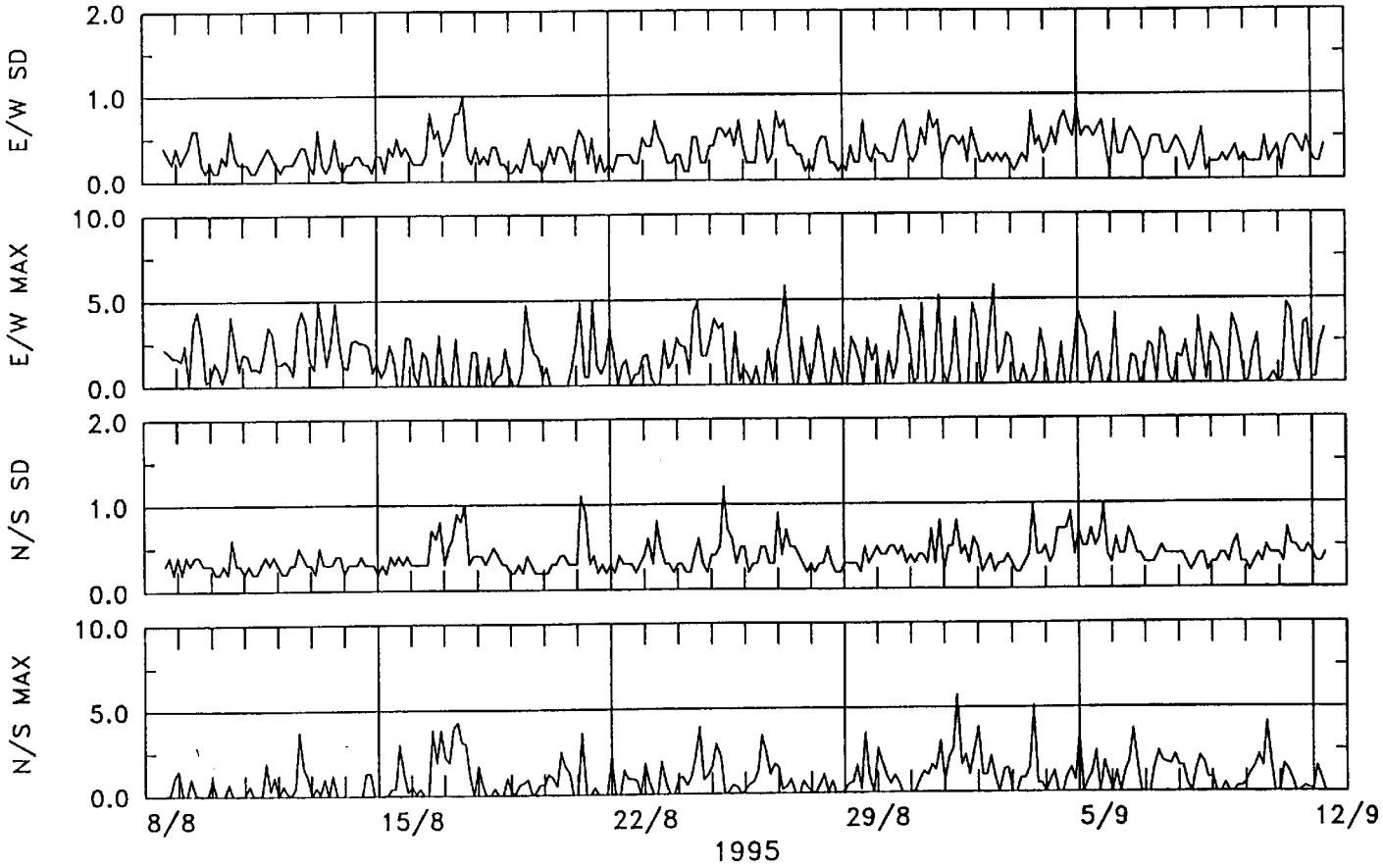
P7 SITE 7. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
NEIL BROWN METER 52. 480*0.5 SECOND AVERAGES EVERY 180 MINUTES
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 0.31 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/95 - 27/04/95 EST



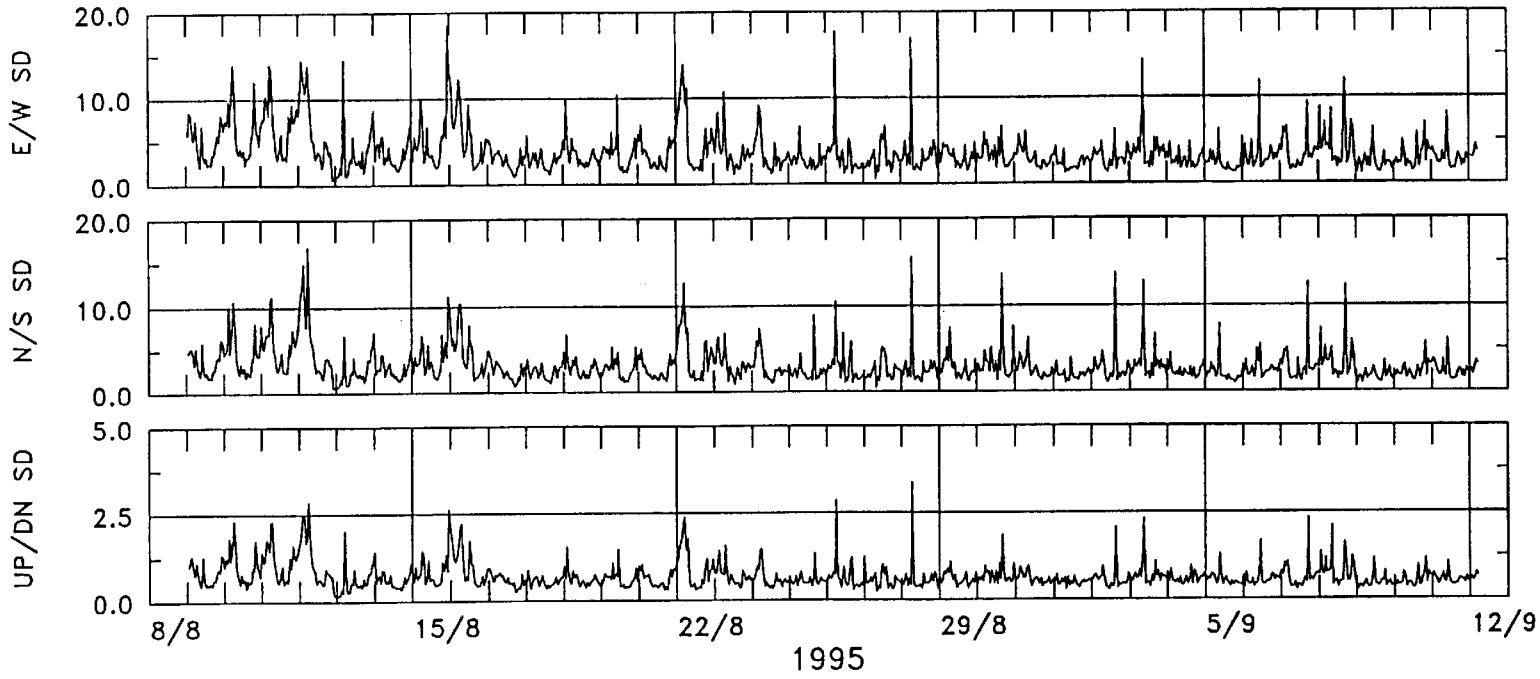
P7 SITE 8. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
S4 METER 4910997. 180*2 SECOND AVERAGES/BURST. BURST, SRB EVERY 120 MINUTES
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 0.50 metres OCEAN DEPTH 5.1 metres
PERIOD 4/11/94 - 5/12/94 EST



P7 SITE 9. STANDARD DEVIATION AND MAXIMUM VELOCITIES (cm/s)
NEIL BROWN METER 52. 480*0.5 SECOND AVERAGES EVERY 180 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.30 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 – 12/09/95 EST



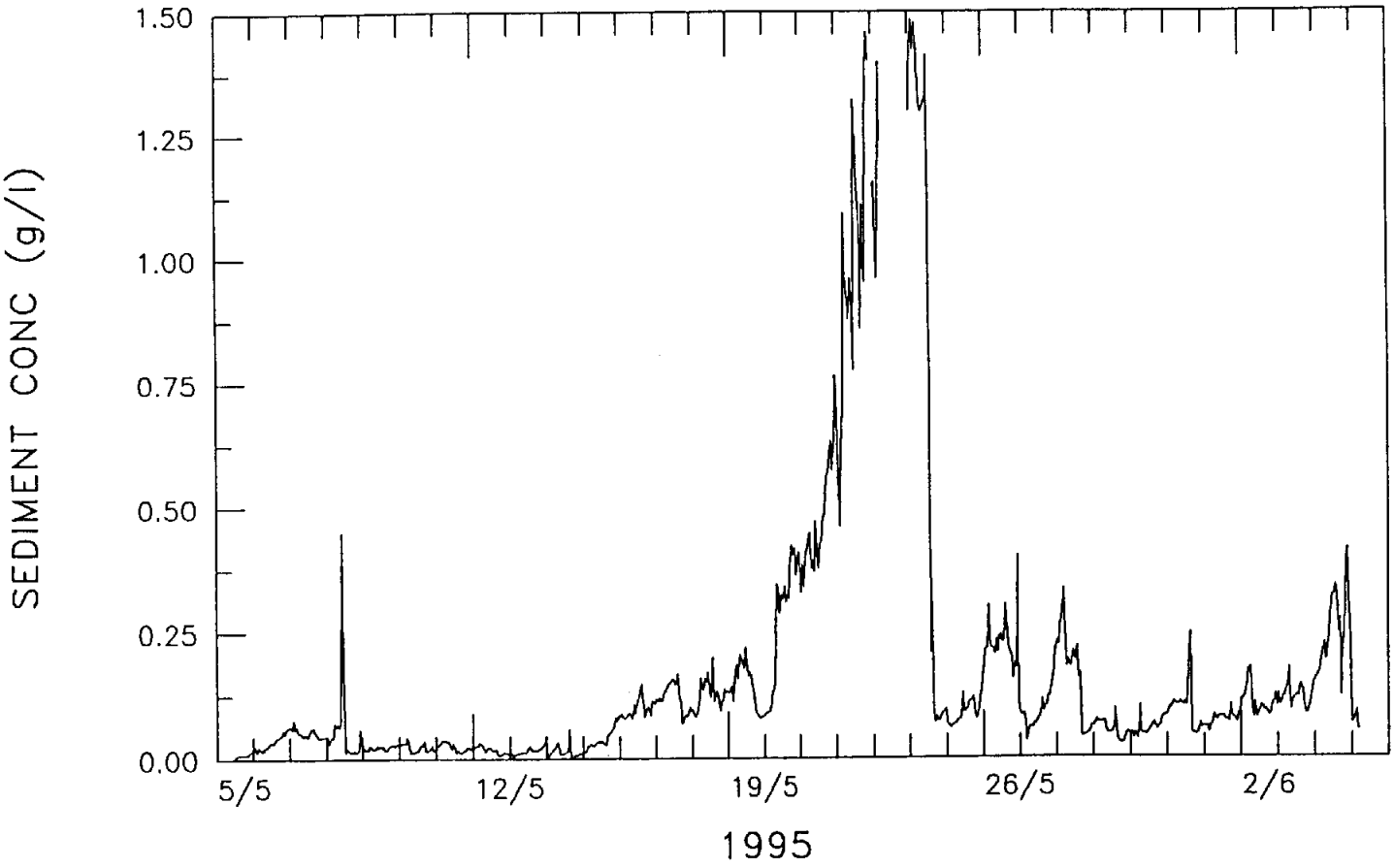
P7 SITE 9. STANDARD DEVIATION (cm/s)
ACOUSTIC DOPPLER VELOCIMETER. 1*100 SECOND AVERAGE EVERY 60 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.19 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 – 12/09/95 EST



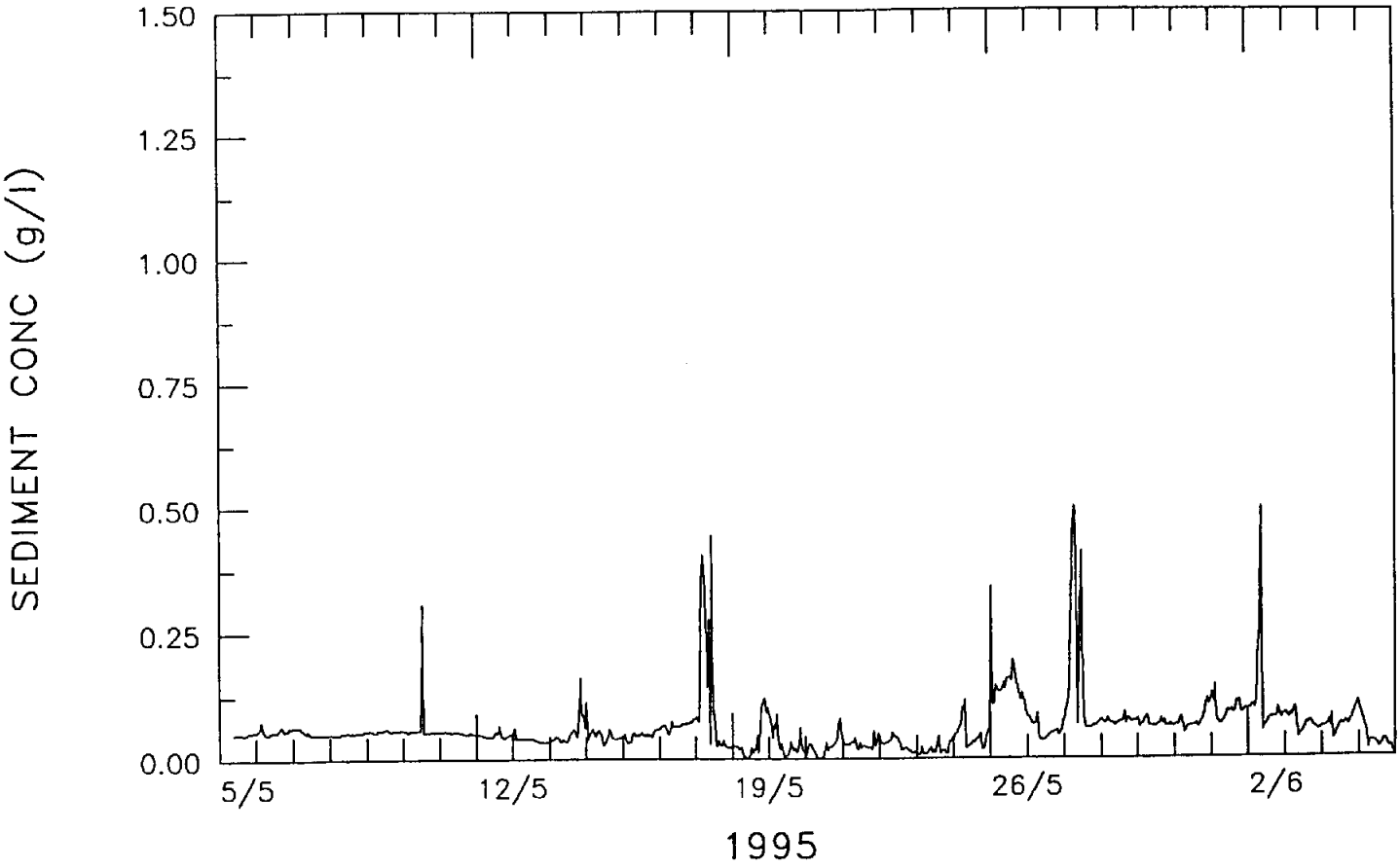
6.3. Appendix 3 - Suspended sediment concentration measurements

Using the calibration coefficients determined for each site, the raw data obtained by the OBS sensors in the field were corrected to produce measurements of suspended sediment concentrations.

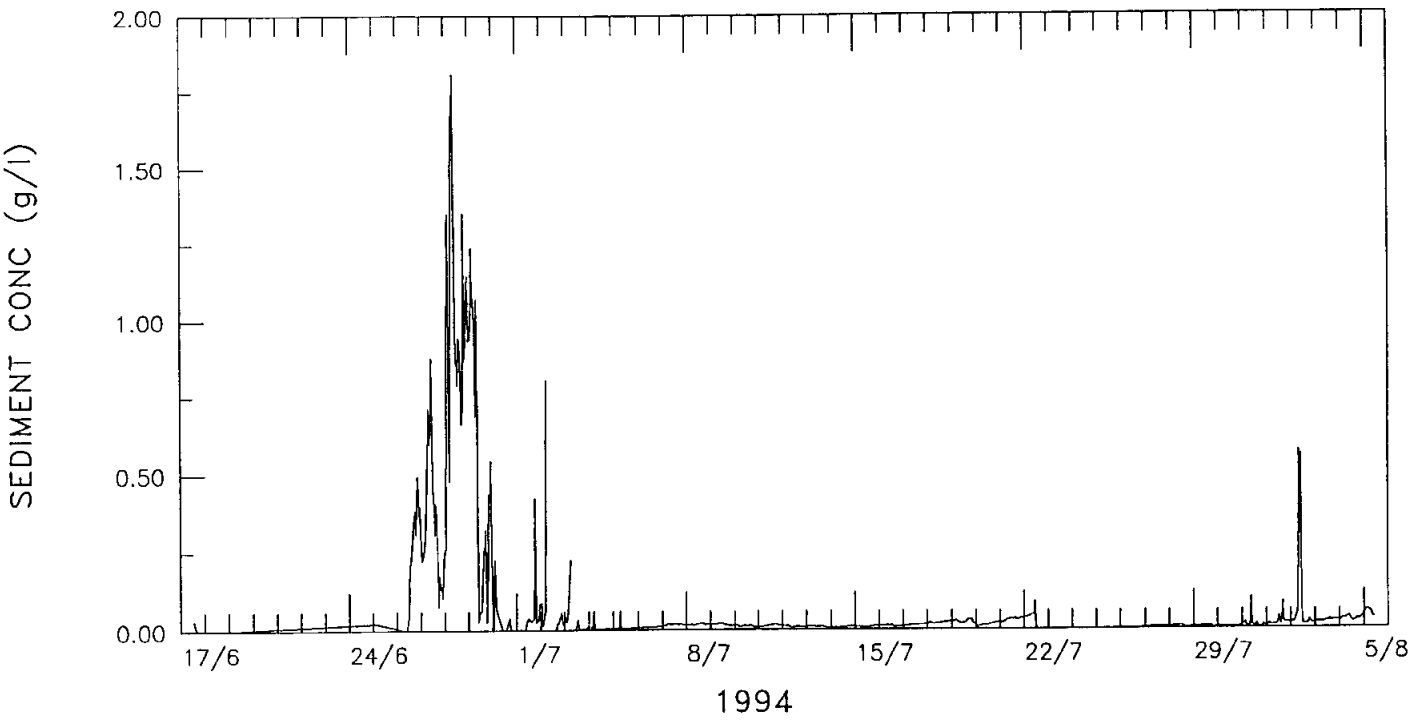
P7 SITE 1 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 4.502'(S) 145° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 0.095 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 – 5/06/95 EST



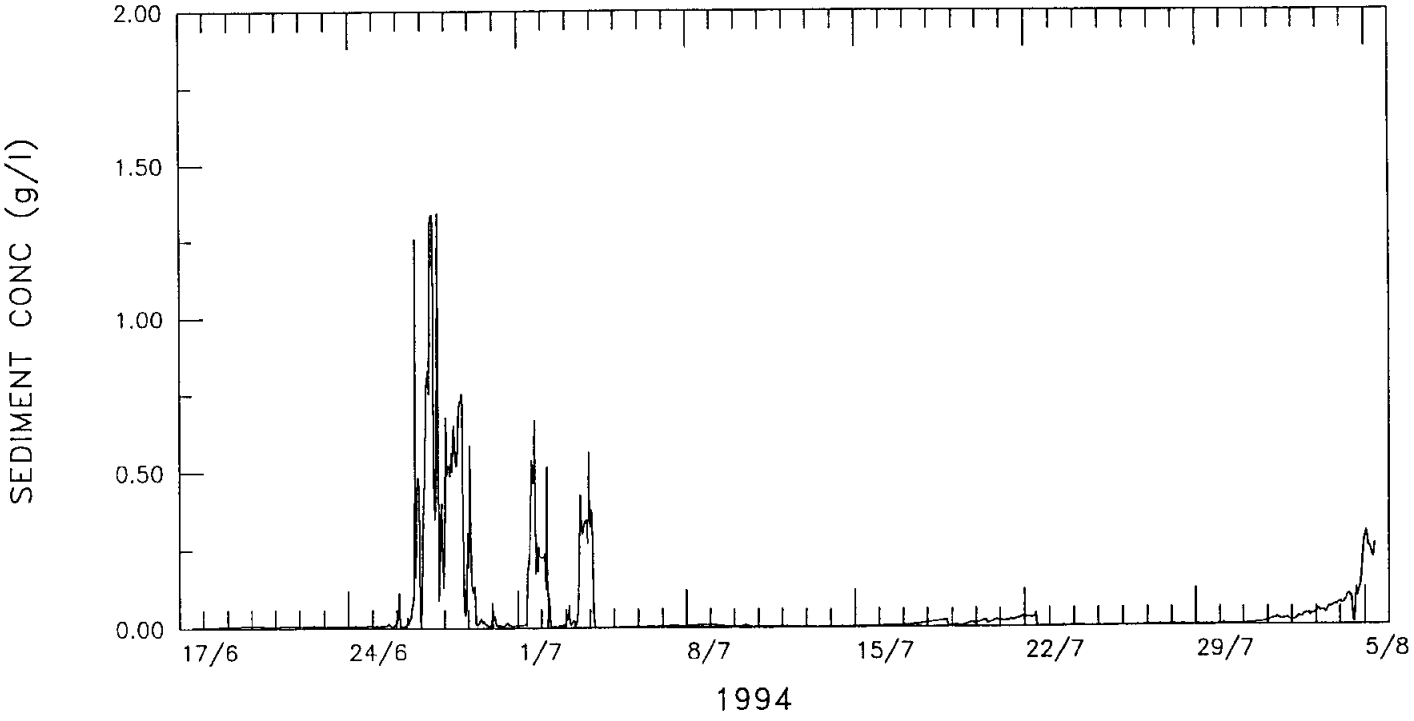
P7 SITE 1 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 4.502'(S) 145° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 0.33 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 - 5/06/95 EST



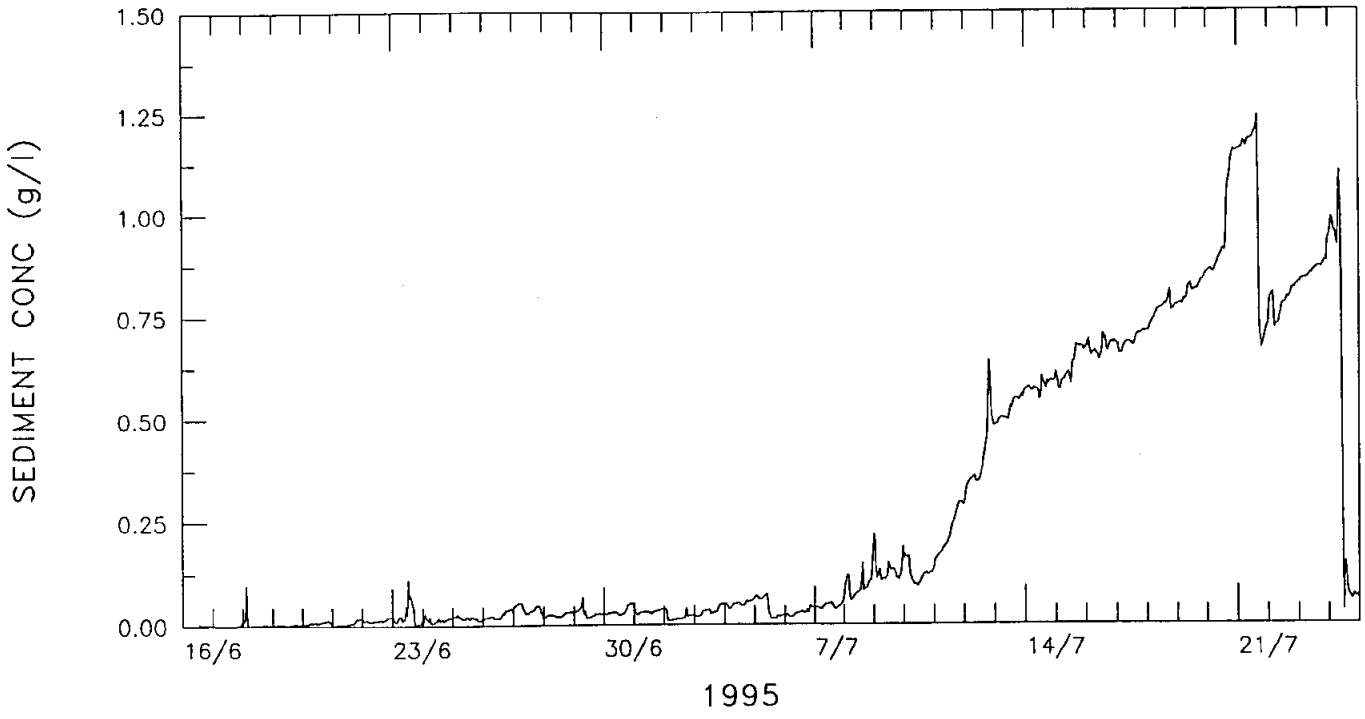
P7 SITE2 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 0.20 metres OCEAN DEPTH 23.4 metres
PERIOD 18/06/94 - 6/08/94 EST



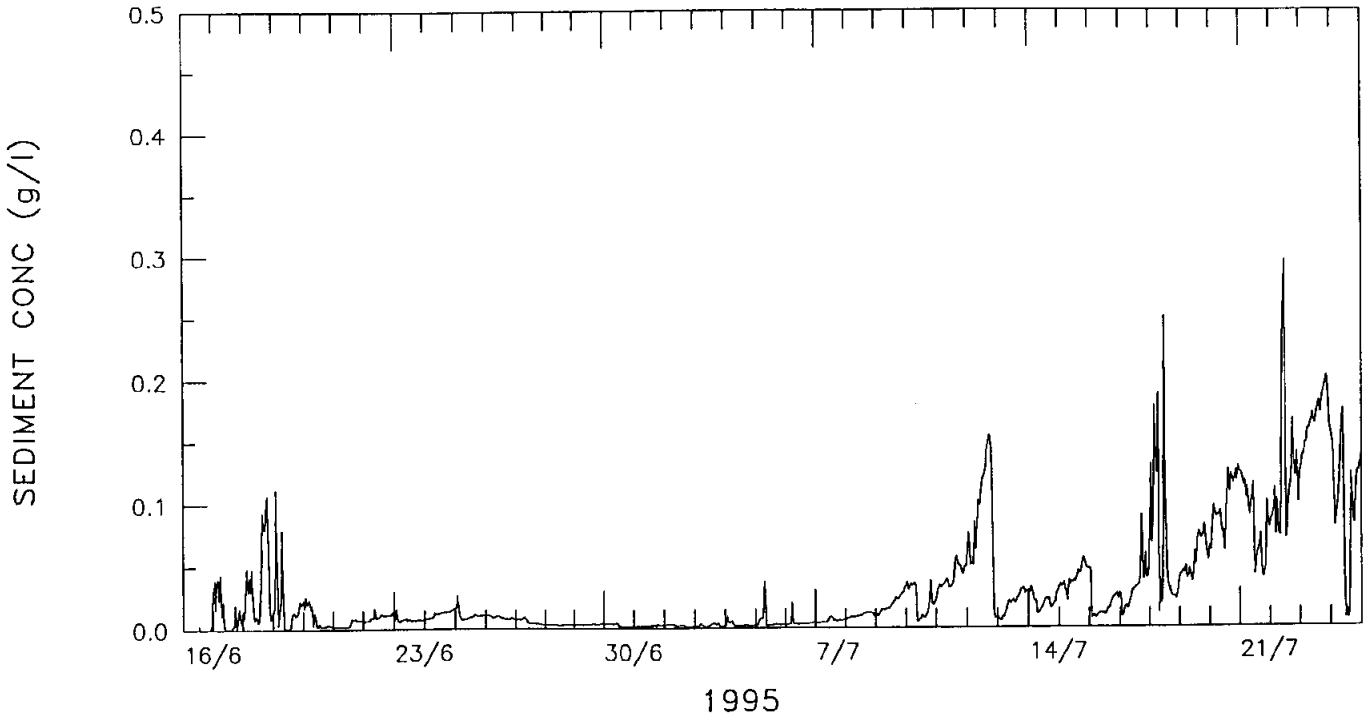
P7 SITE2 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 0.40 metres OCEAN DEPTH 23.4 metres
PERIOD 18/06/94 - 6/08/94 EST



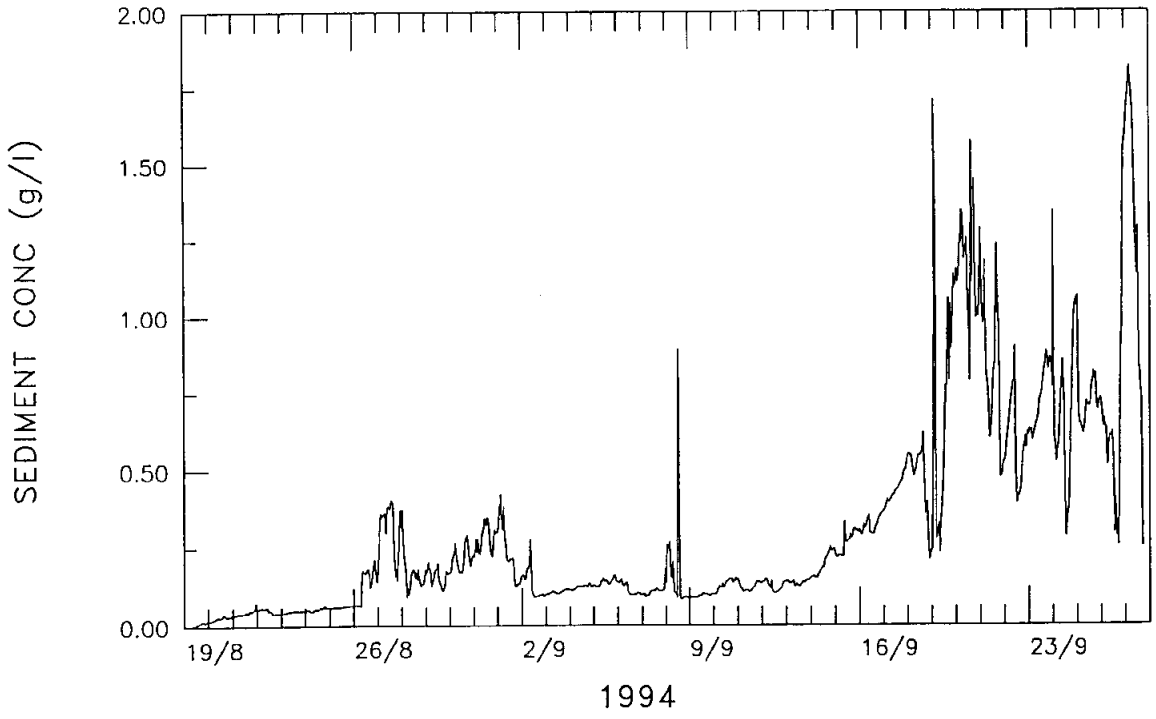
P7 SITE 3 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 0.10 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 - 24/07/95 EST



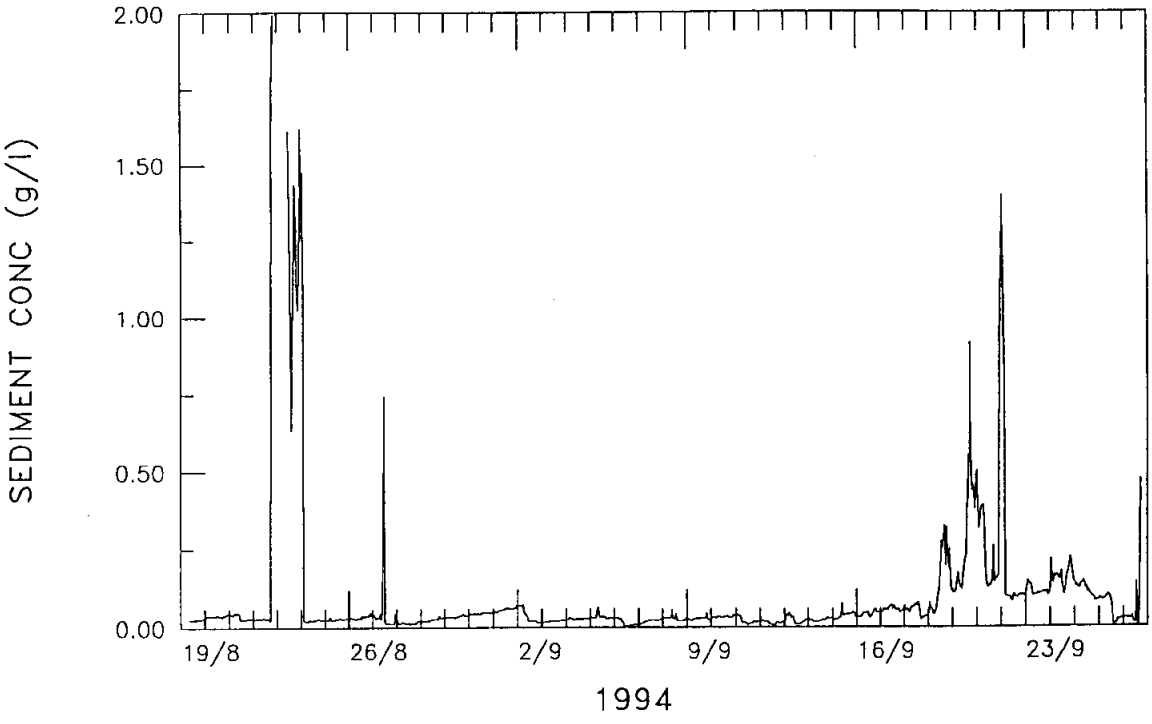
P7 SITE 3 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 0.33 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 - 24/07/95 EST



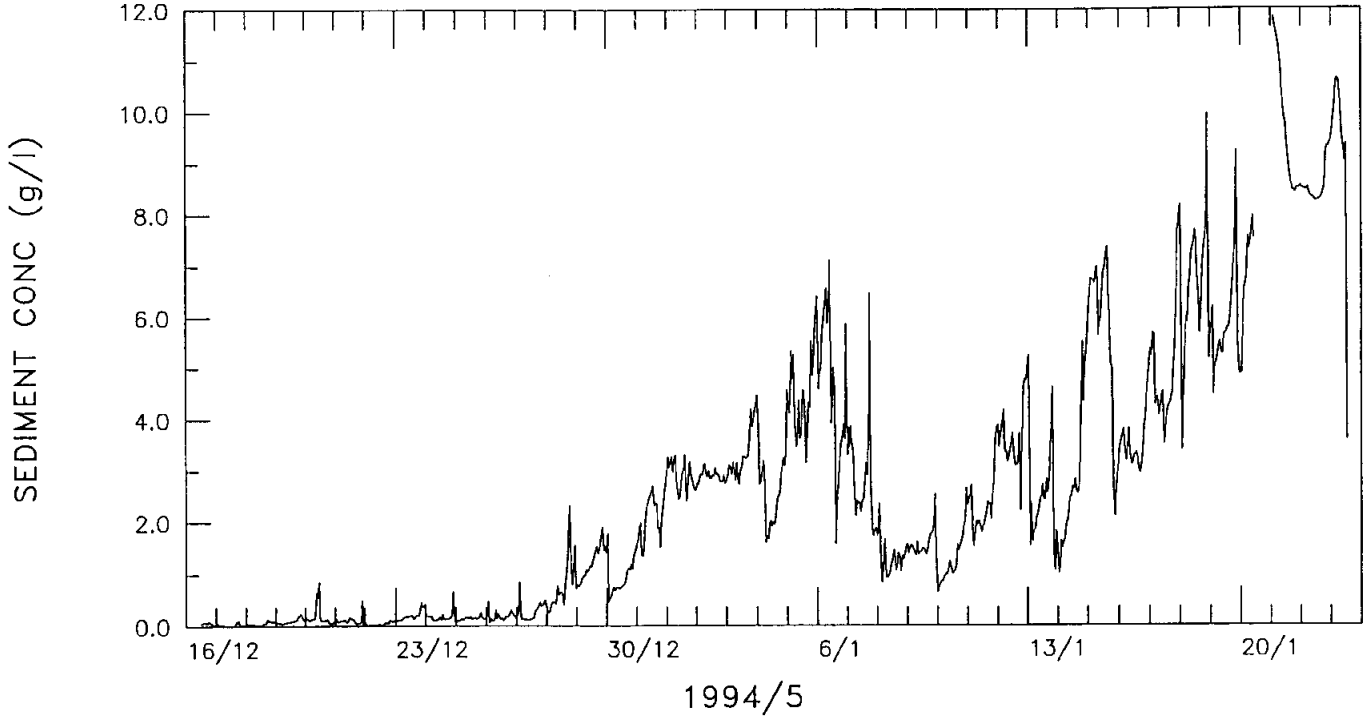
P7 SITE 5 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8112. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 0.15 metres OCEAN DEPTH 14.6 metres
PERIOD 19/08/94 - 27/09/94 EST



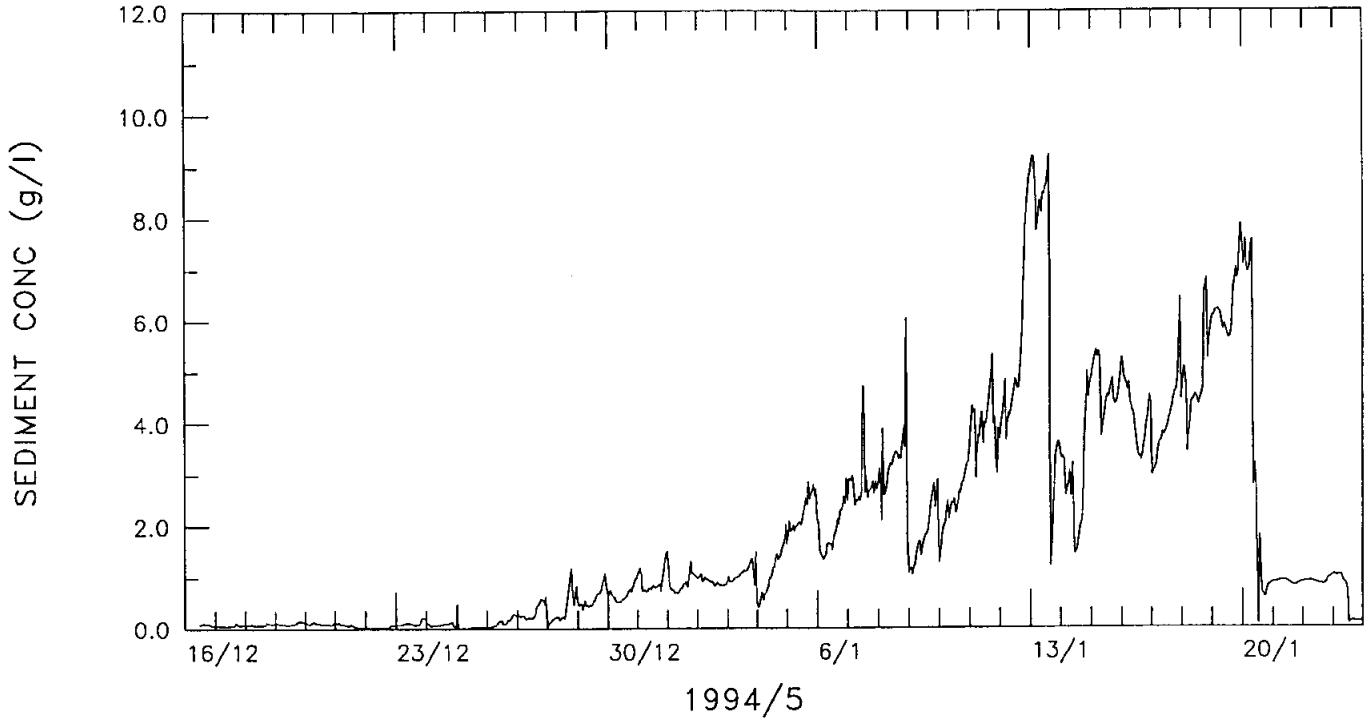
P7 SITE 5 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8112. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 0.40 metres OCEAN DEPTH 14.6 metres
PERIOD 19/08/94 - 27/09/94 EST



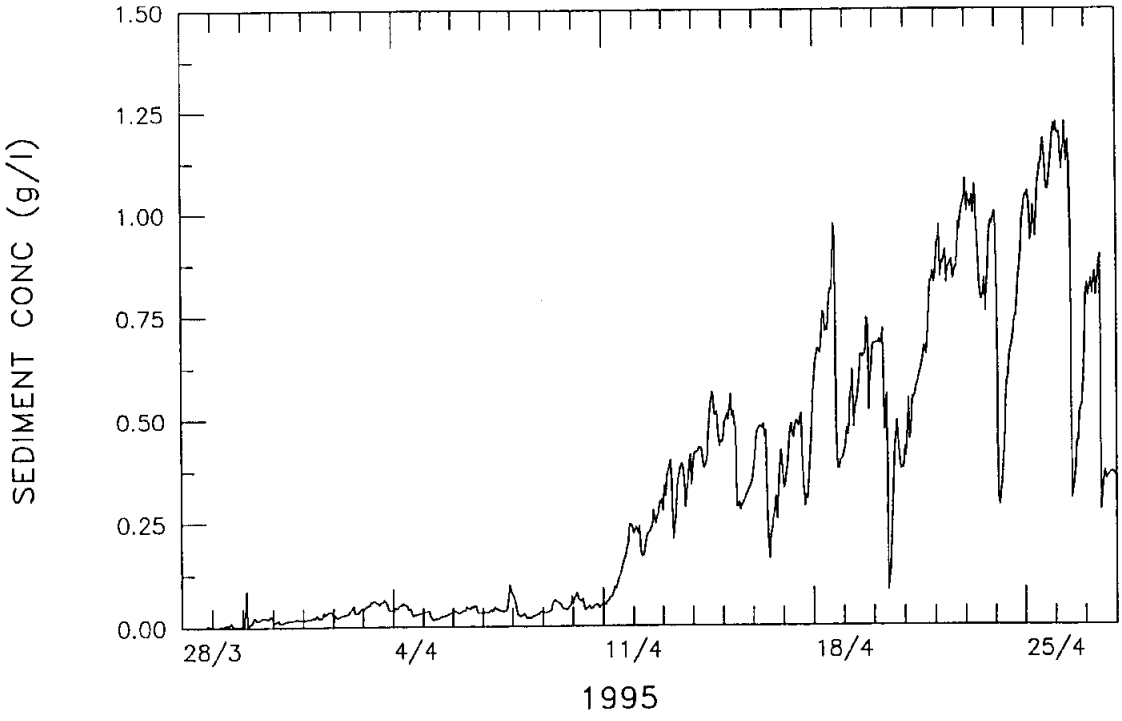
P7 SITE 6 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 0.115 metres OCEAN DEPTH 8.5 metres
PERIOD 16/12/94 - 24/01/95 EST



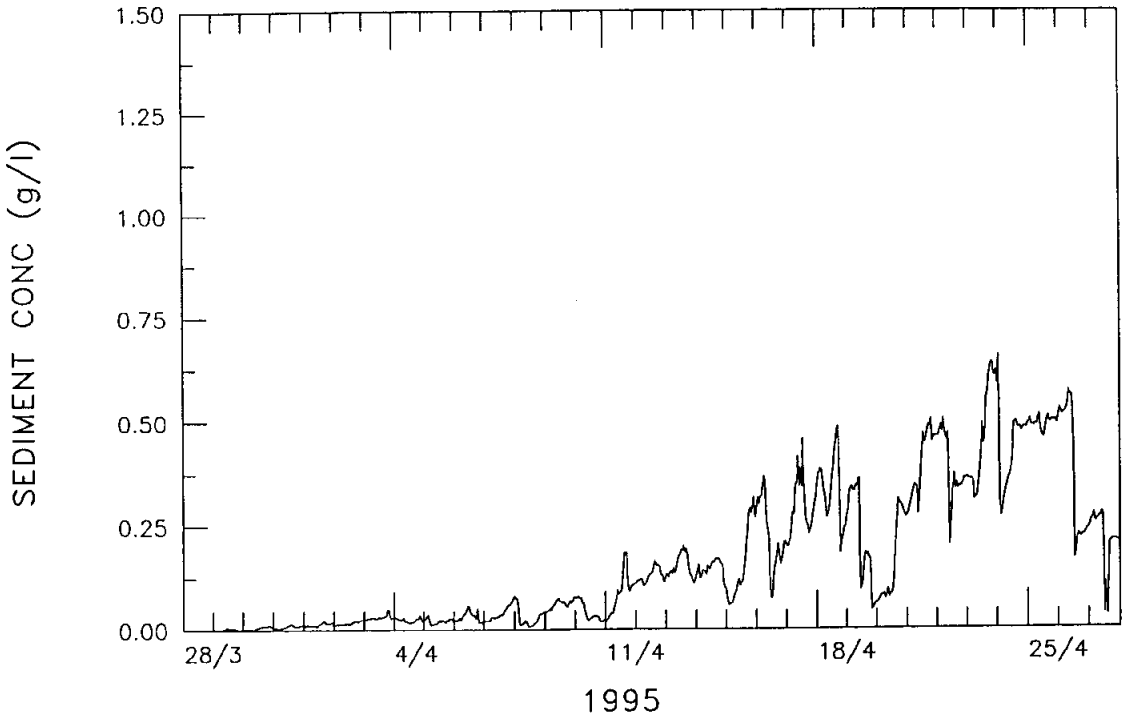
P7 SITE 6 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 0.370 metres OCEAN DEPTH 8.5 metres
PERIOD 16/12/94 - 24/01/95 EST



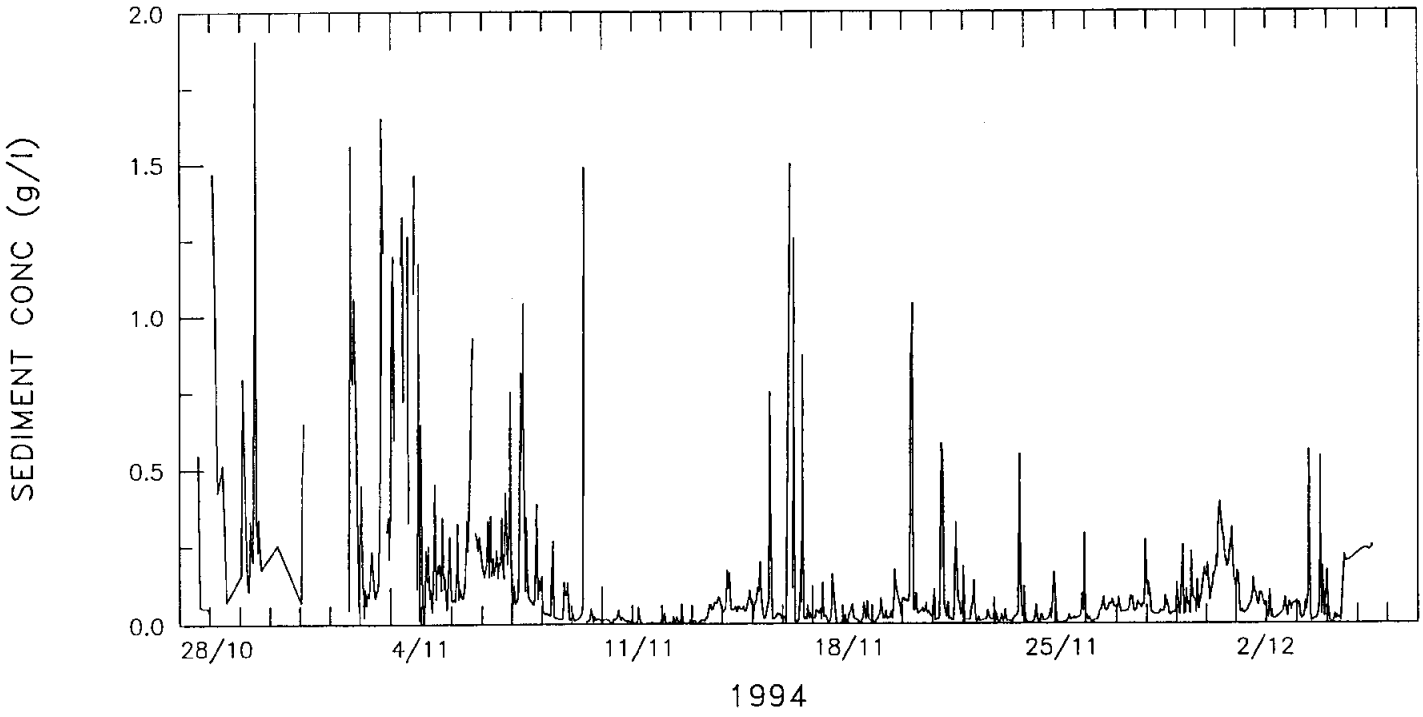
P7 SITE 7 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 0.10 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/95 - 27/04/95 EST



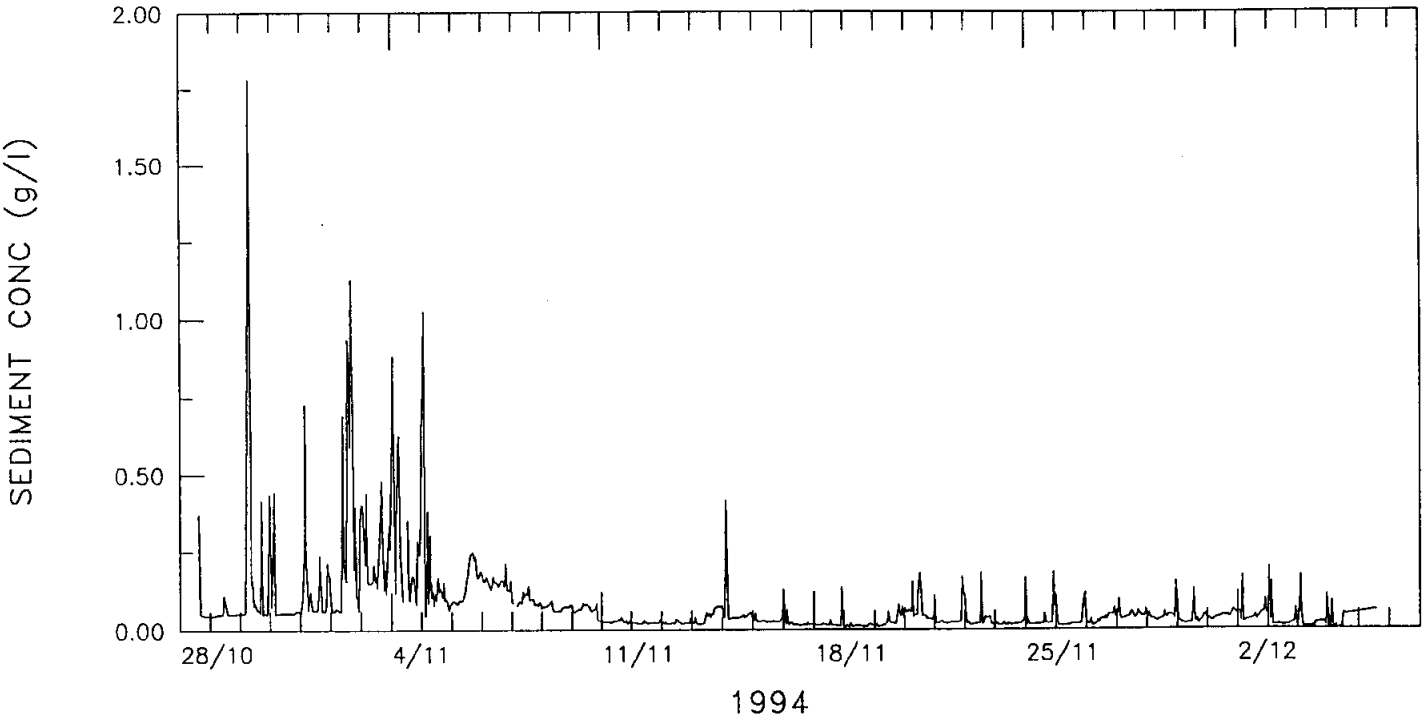
P7 SITE 7 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 0.34 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/95 – 27/04/95 EST



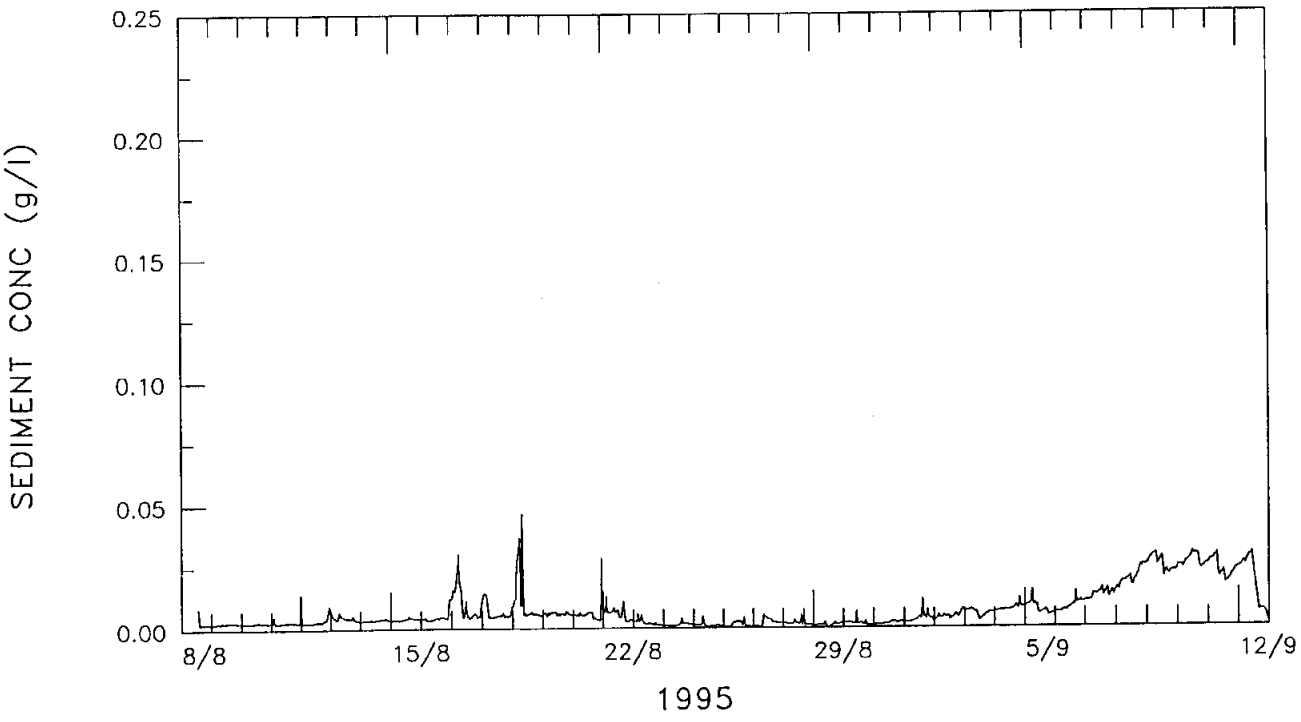
P7 SITE 8 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 0.103 metres OCEAN DEPTH 5.1 metres
PERIOD 28/10/94 - 7/12/94 EST



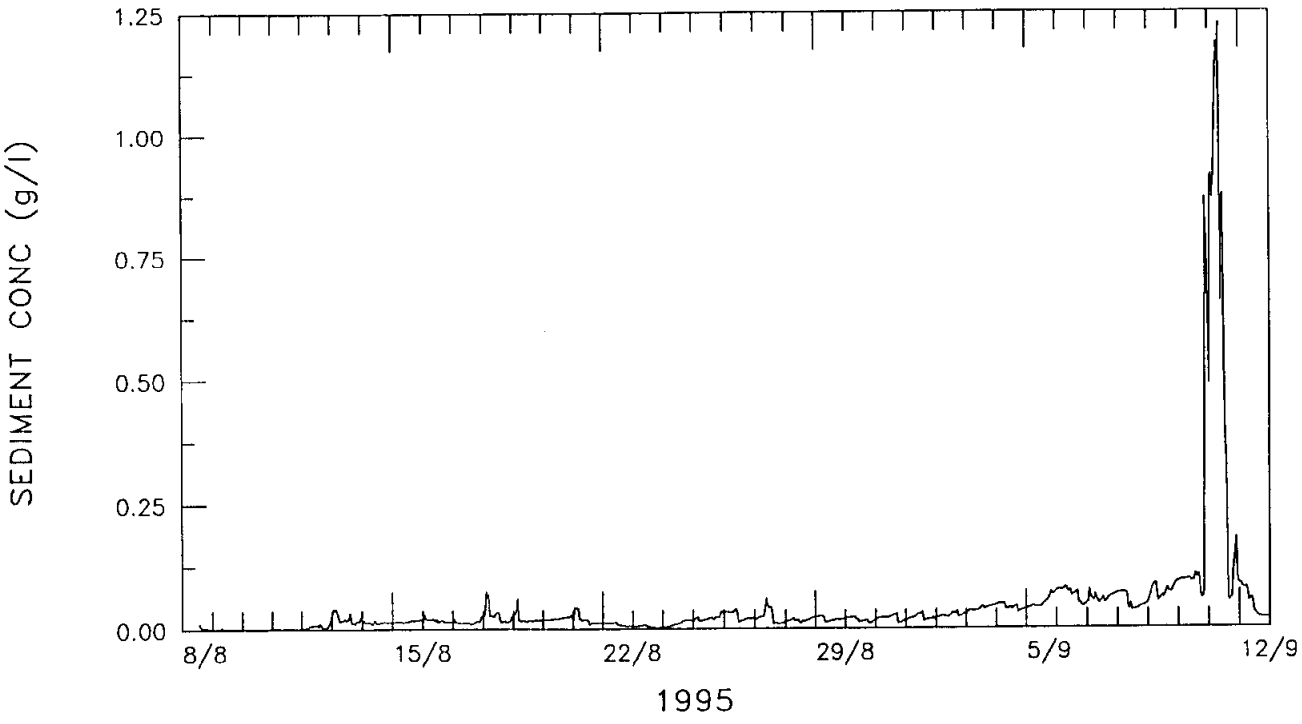
P7 SITE 8 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 0.354 metres OCEAN DEPTH 5.1 metres
PERIOD 28/10/94 - 7/12/94 EST



P7 SITE 9 SEDIMENT CONCENTRATION
OBS 360 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.32 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 - 12/09/95 EST



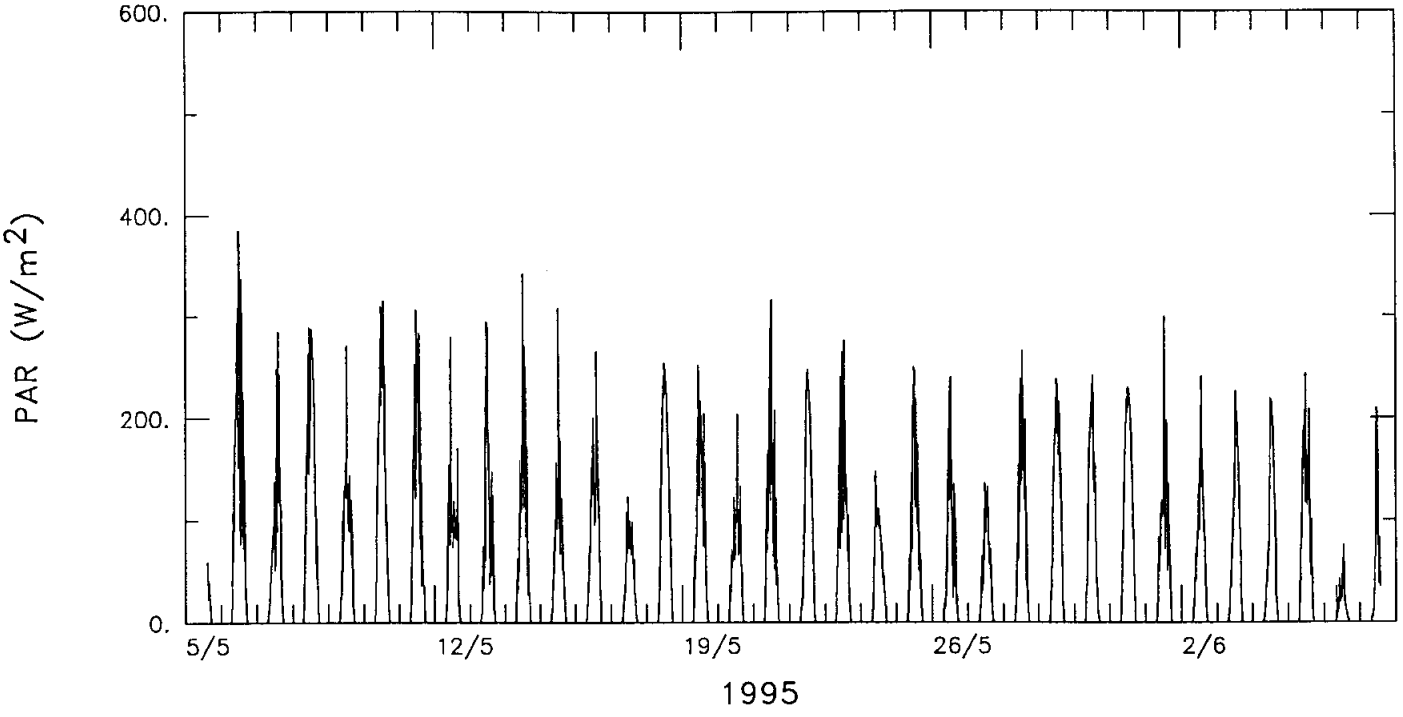
P7 SITE 9 SEDIMENT CONCENTRATION
OBS 224 ON LOGGER 8111. 3 MINUTE AVERAGES EVERY 60 MINUTES
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.08 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 – 12/09/95 EST



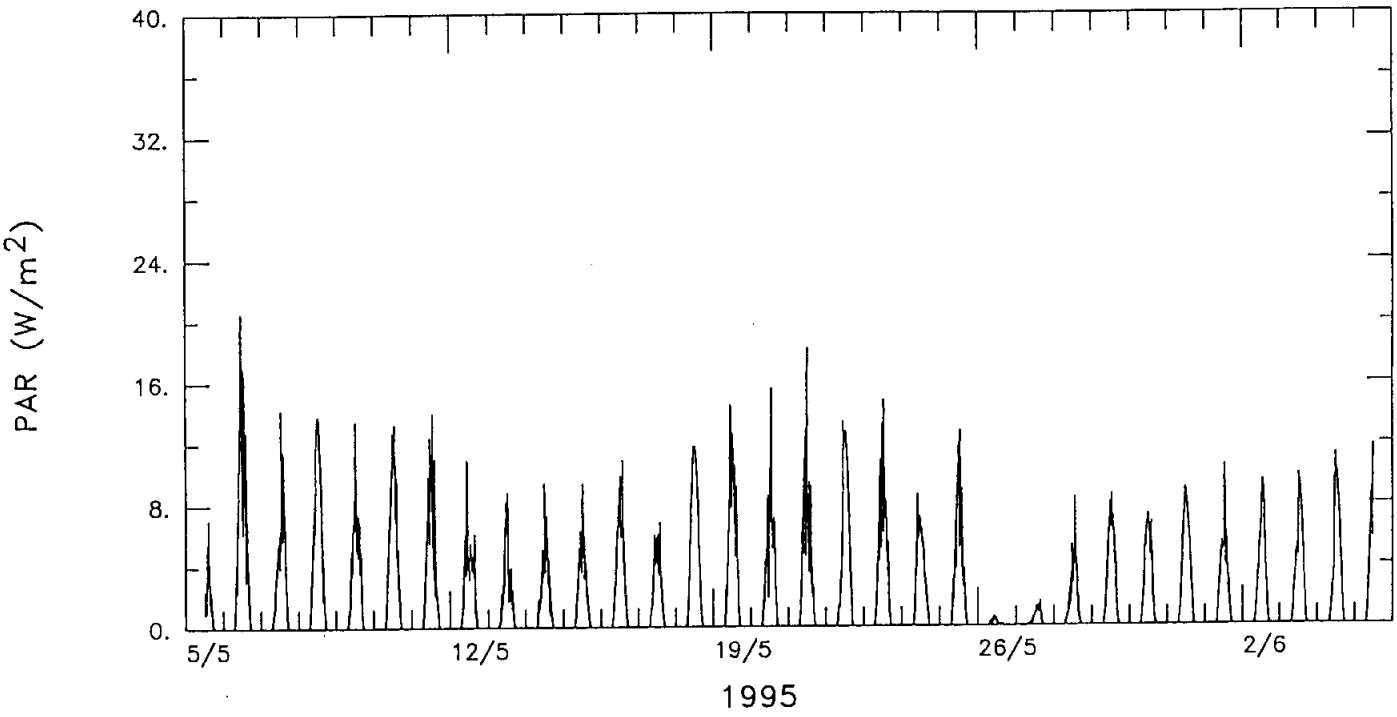
6.4. Appendix 4 - Light intensity (PAR) measurements

Measurements of PAR were collected at two heights on the SEDCAM frame to provide a measure of the attenuation of light during sediment transport. A record of surface incident PAR was collected simultaneously at a location close to the instrument deployment site.

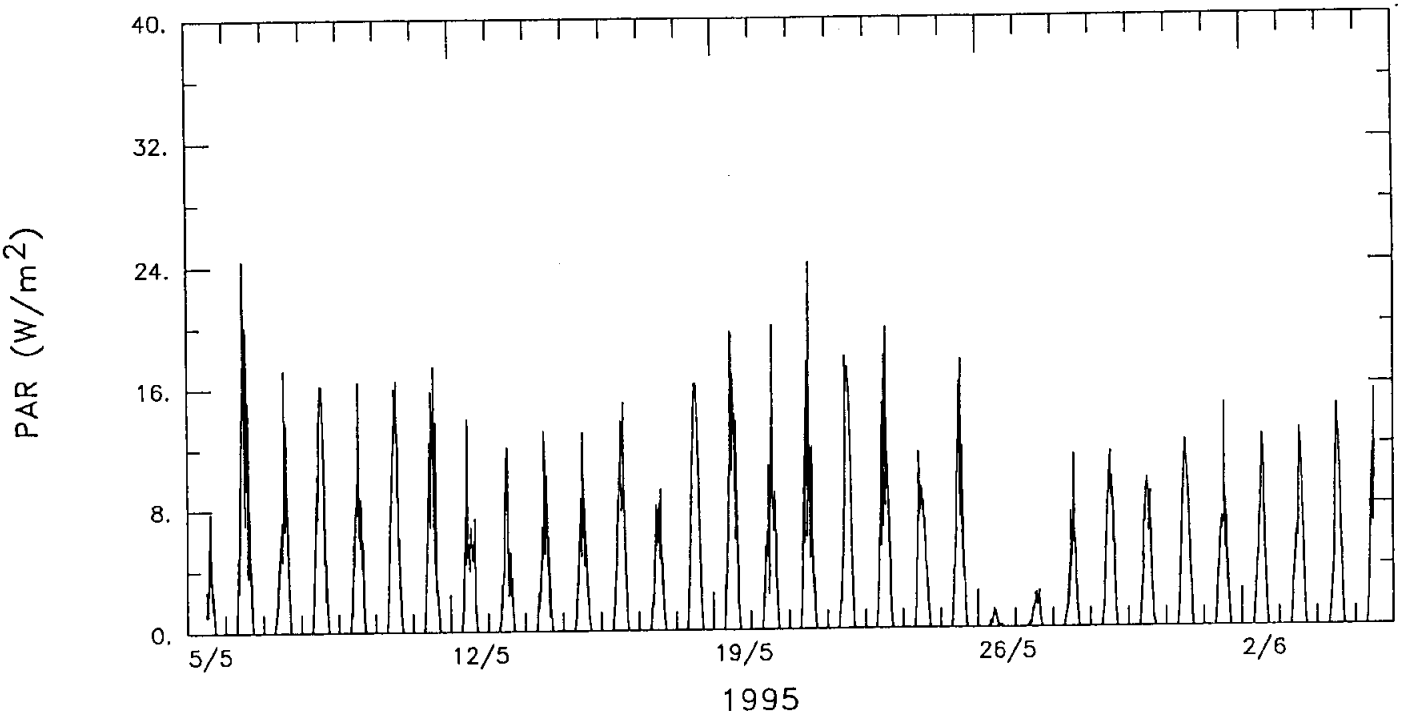
P7 SITE 1, IN AIR. LIGHTMETER 92407
POSITION 38° 4.924'(S) 145° 7.325'(E) CARRUM SIGNAL MAINTENANCE DEPOT
INSTRUMENT HEIGHT ABOVE SEA LEVEL 5 metres
PERIOD 5/05/95 – 7/06/95



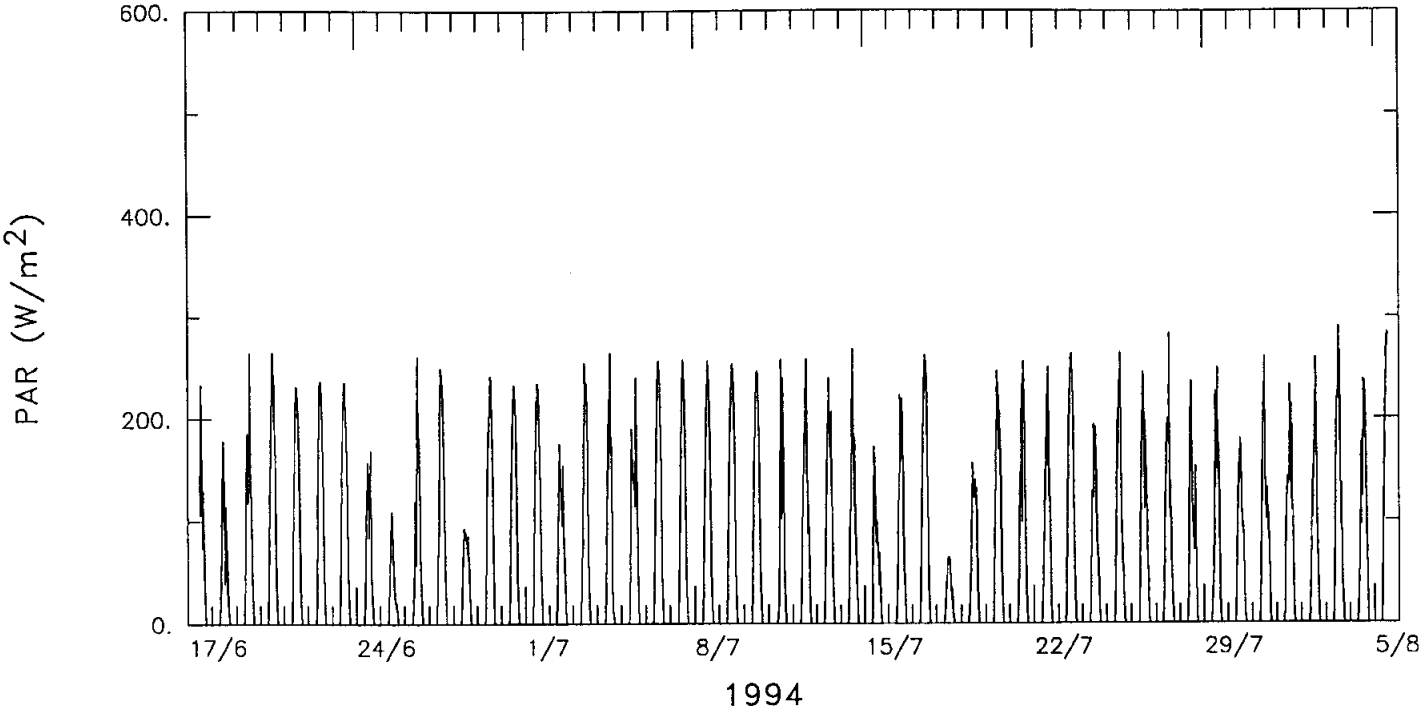
P7 SITE 1. LIGHTMETER 92409
POSITION 38° 4.502'(S) 144° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 0.39 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 - 5/06/95



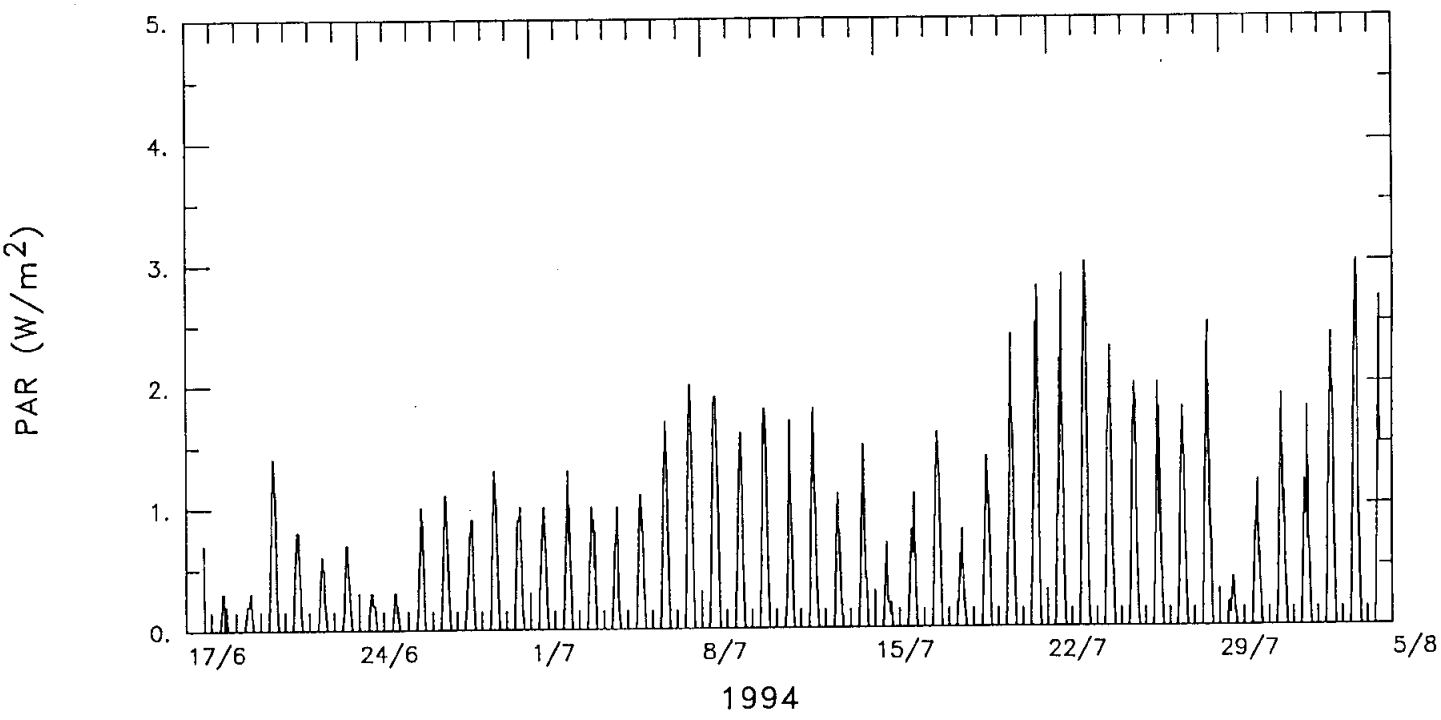
P7 SITE 1. LIGHTMETER 92408
POSITION 38° 4.502'(S) 145° 5.795'(E)
INSTRUMENT HEIGHT ABOVE BED 1.81 metres OCEAN DEPTH 7.7 metres
PERIOD 5/05/95 - 5/06/95



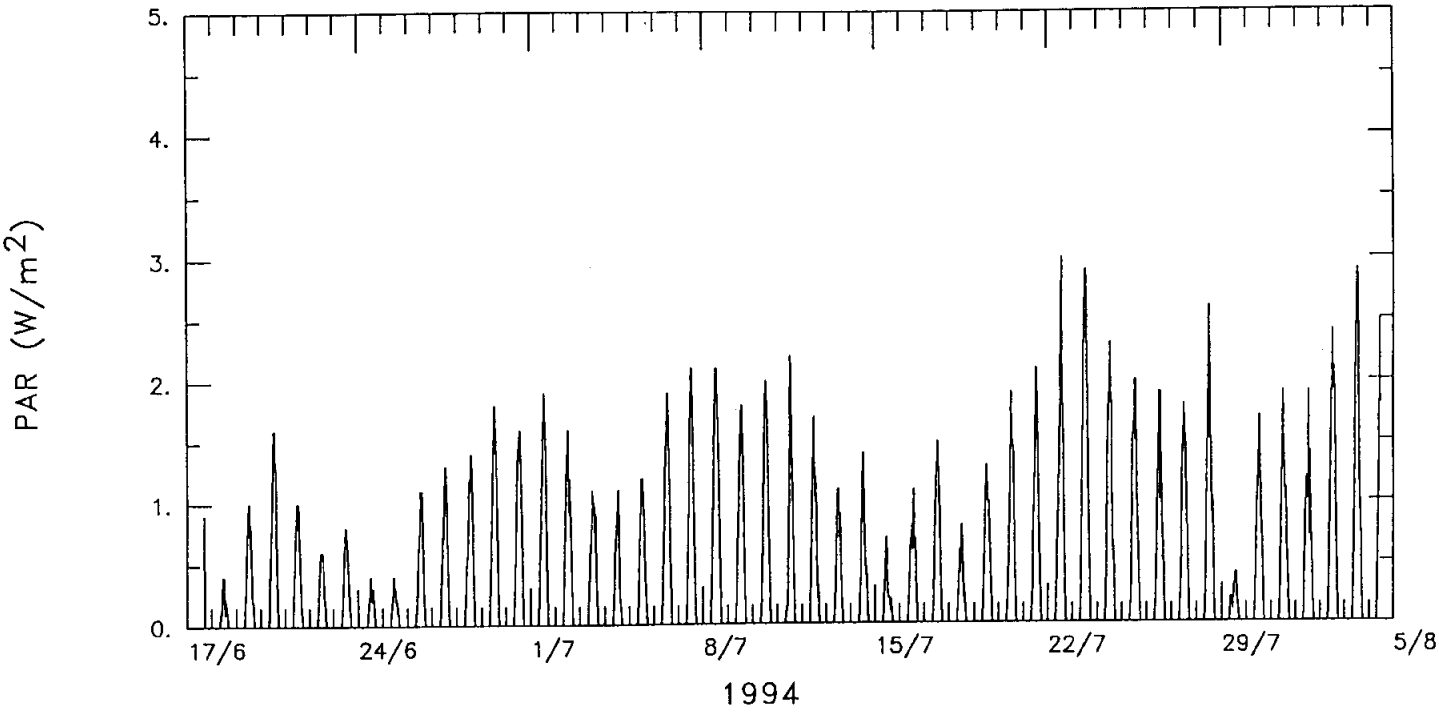
P7 SITE 2, IN AIR. LIGHTMETER 92407
POSITION 38° 15.98'(S) 144° 39.95'(E) QUEENSCLIFF MARINE STATION
INSTRUMENT HEIGHT ABOVE SEA LEVEL 8 metres
PERIOD 17/06/94 - 5/08/94



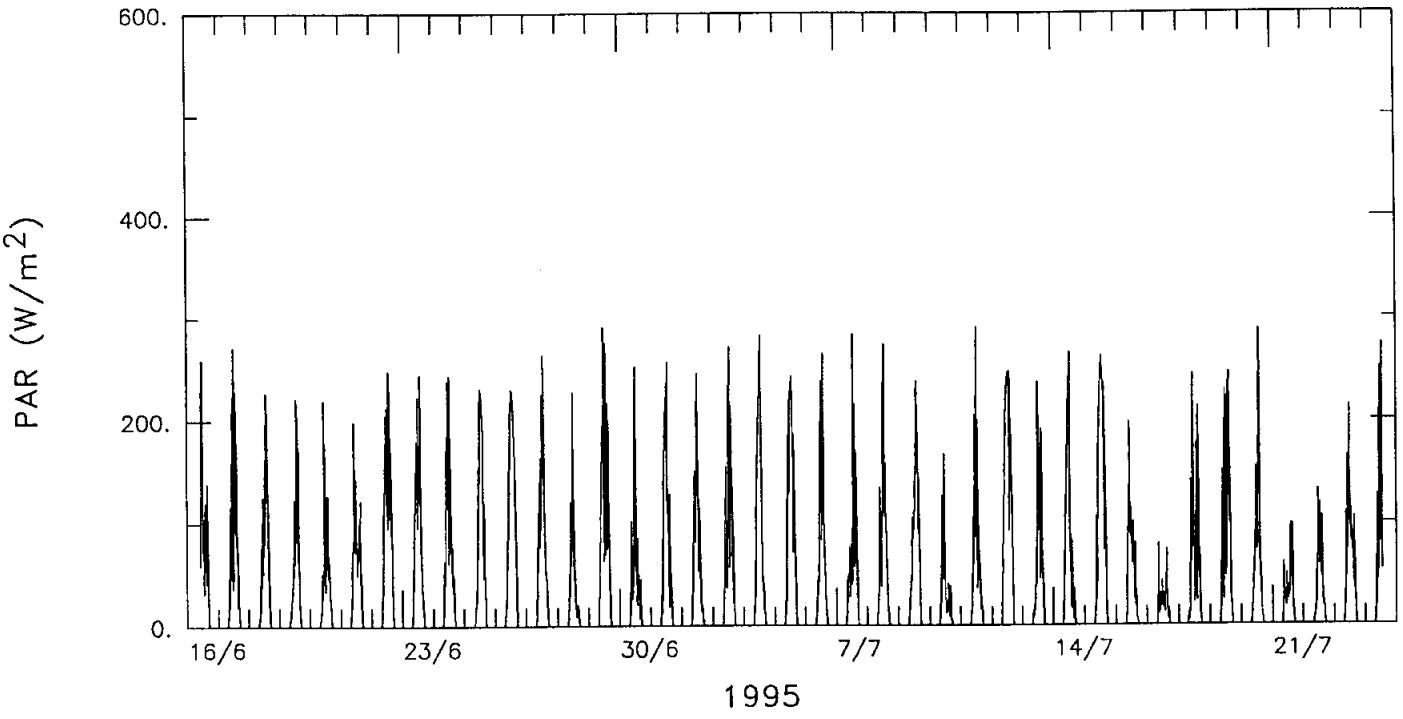
P7 SITE 2. LIGHTMETER 92408
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 0.40 metres OCEAN DEPTH 23.6 metres
PERIOD 17/06/94 - 4/08/94



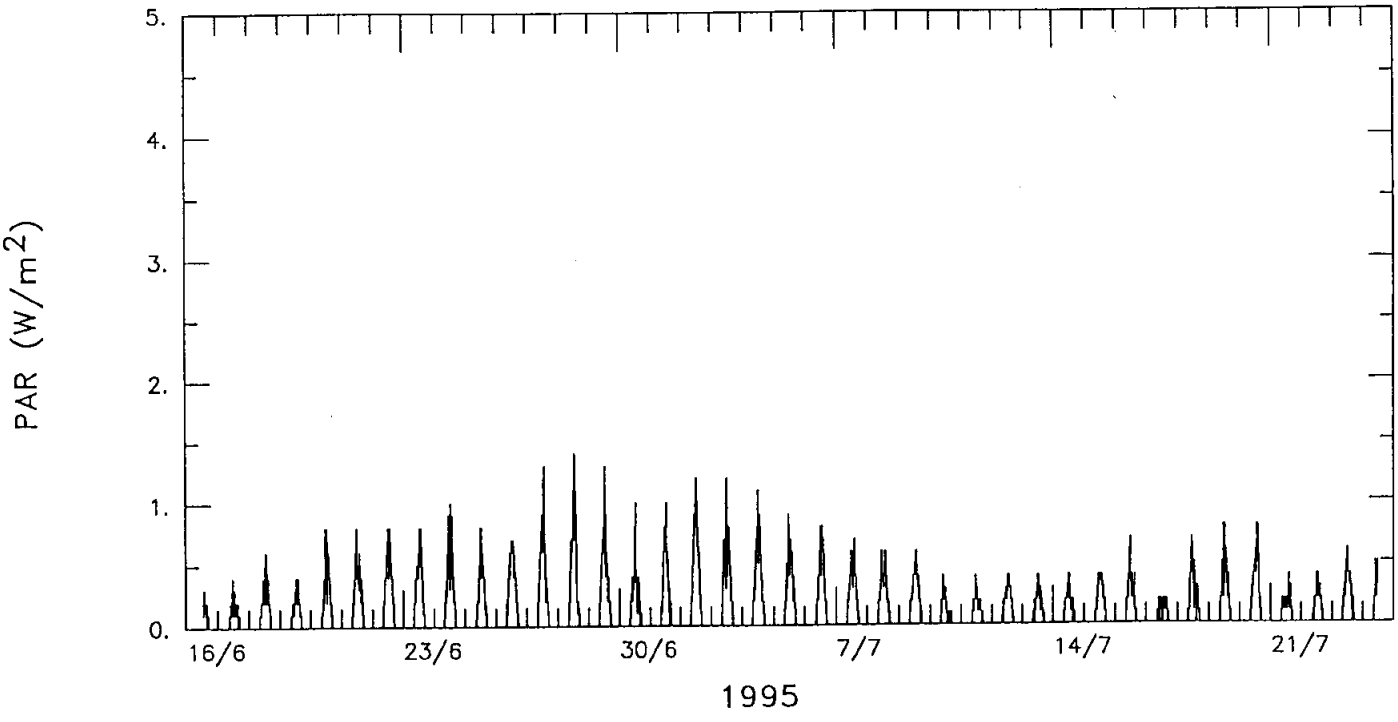
P7 SITE 2. LIGHTMETER 92409
POSITION 38° 11.994'(S) 144° 52.167'(E)
INSTRUMENT HEIGHT ABOVE BED 1.86 metres OCEAN DEPTH 23.6 metres
PERIOD 17/06/94 - 4/08/94



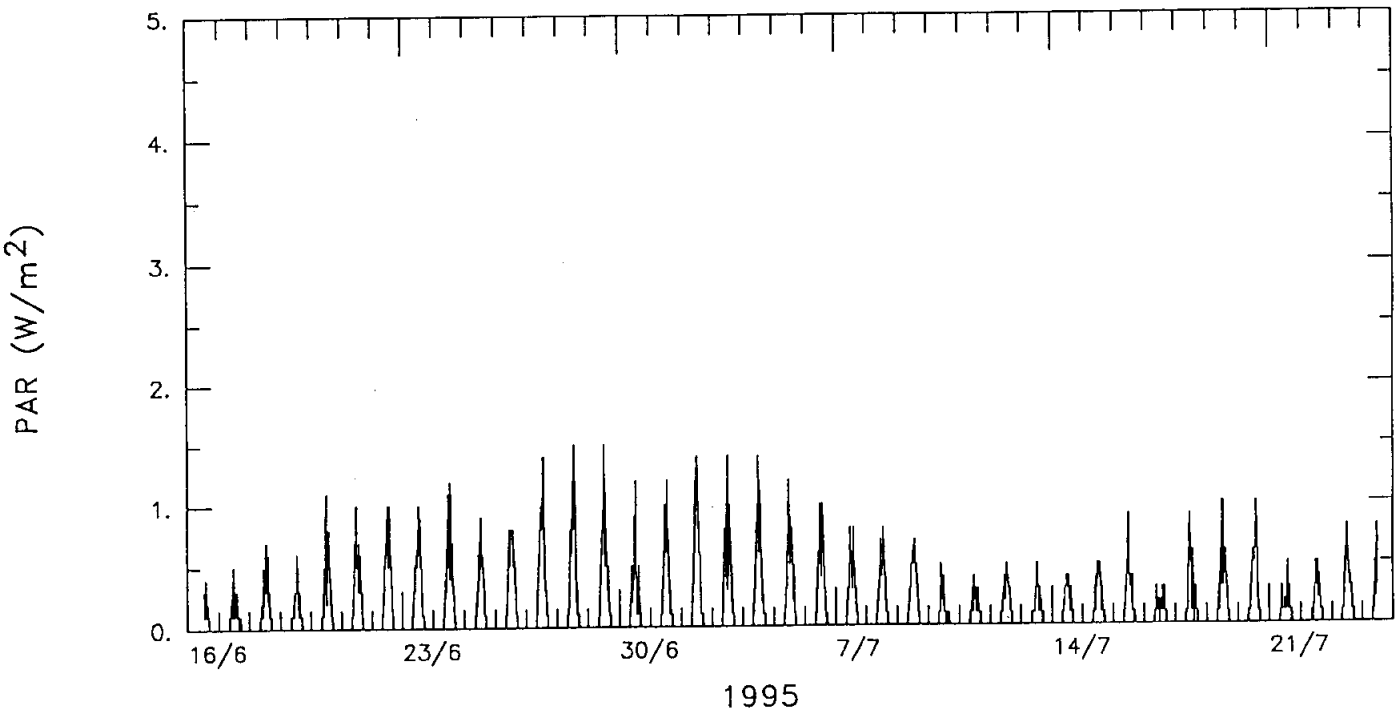
P7 SITE 3, IN AIR. LIGHTMETER 92407
POSITION 38° 11.65'(S) 144° 45.30'(E) WEST CHANNEL PILE
INSTRUMENT HEIGHT ABOVE SEA LEVEL 5 metres
PERIOD 16/06/95 - 24/07/95



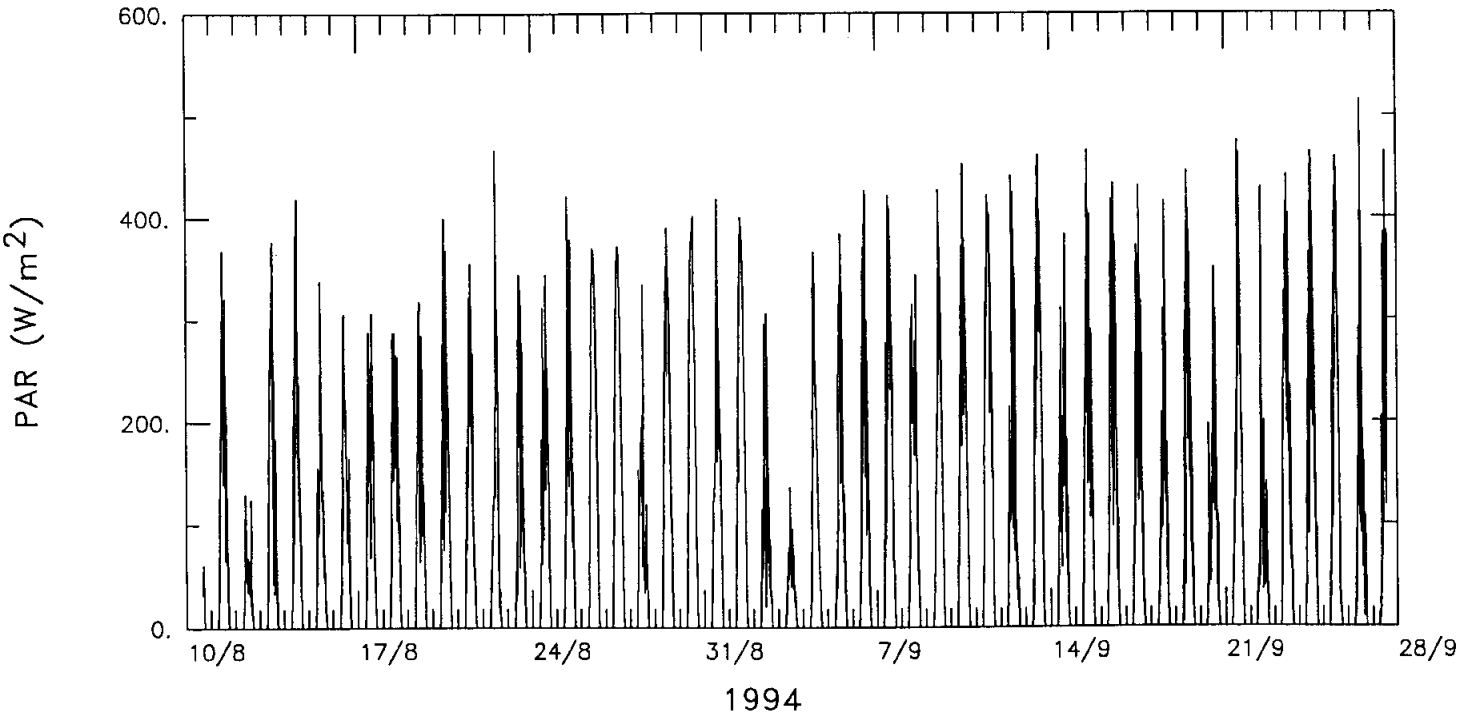
P7 SITE 3. LIGHTMETER 92408
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 0.41 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 - 24/07/95



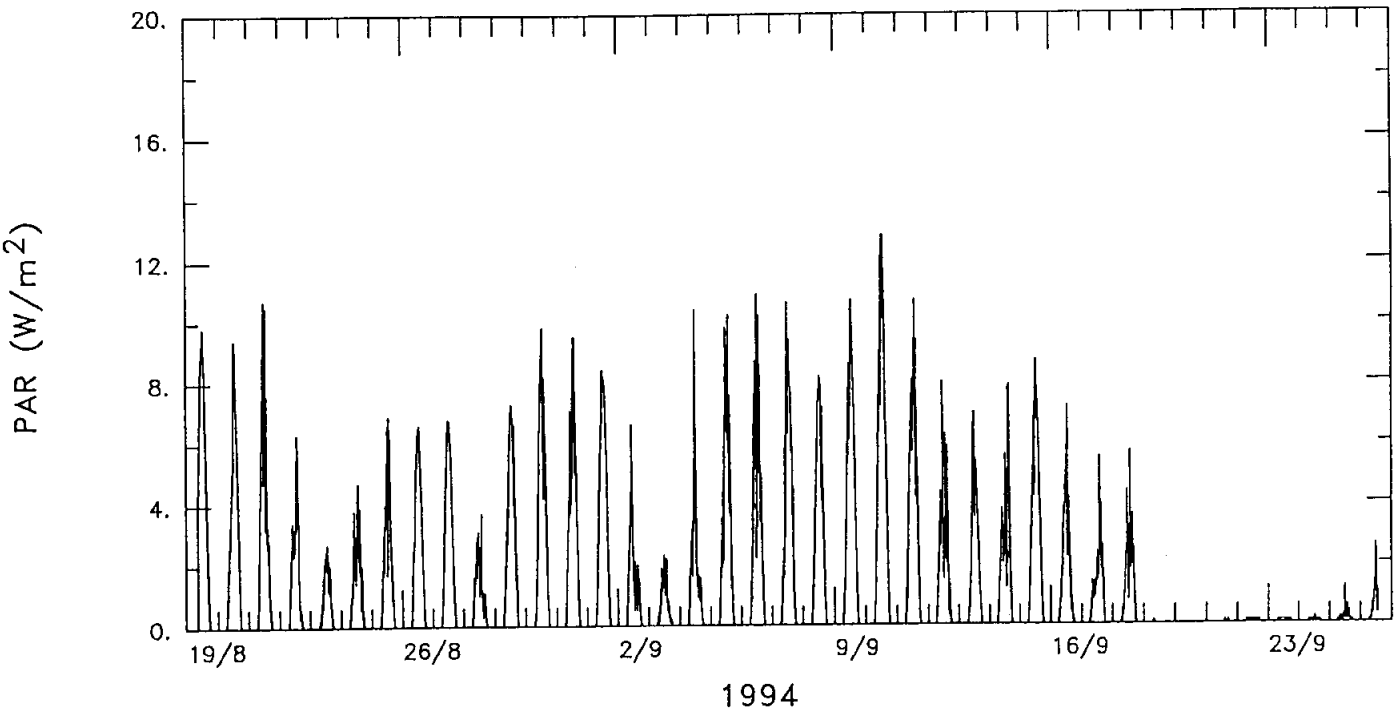
P7 SITE 3. LIGHTMETER 92409
POSITION 38° 7.13'(S) 144° 52.79'(E)
INSTRUMENT HEIGHT ABOVE BED 1.75 metres OCEAN DEPTH 24.8 metres
PERIOD 16/06/95 - 24/07/95



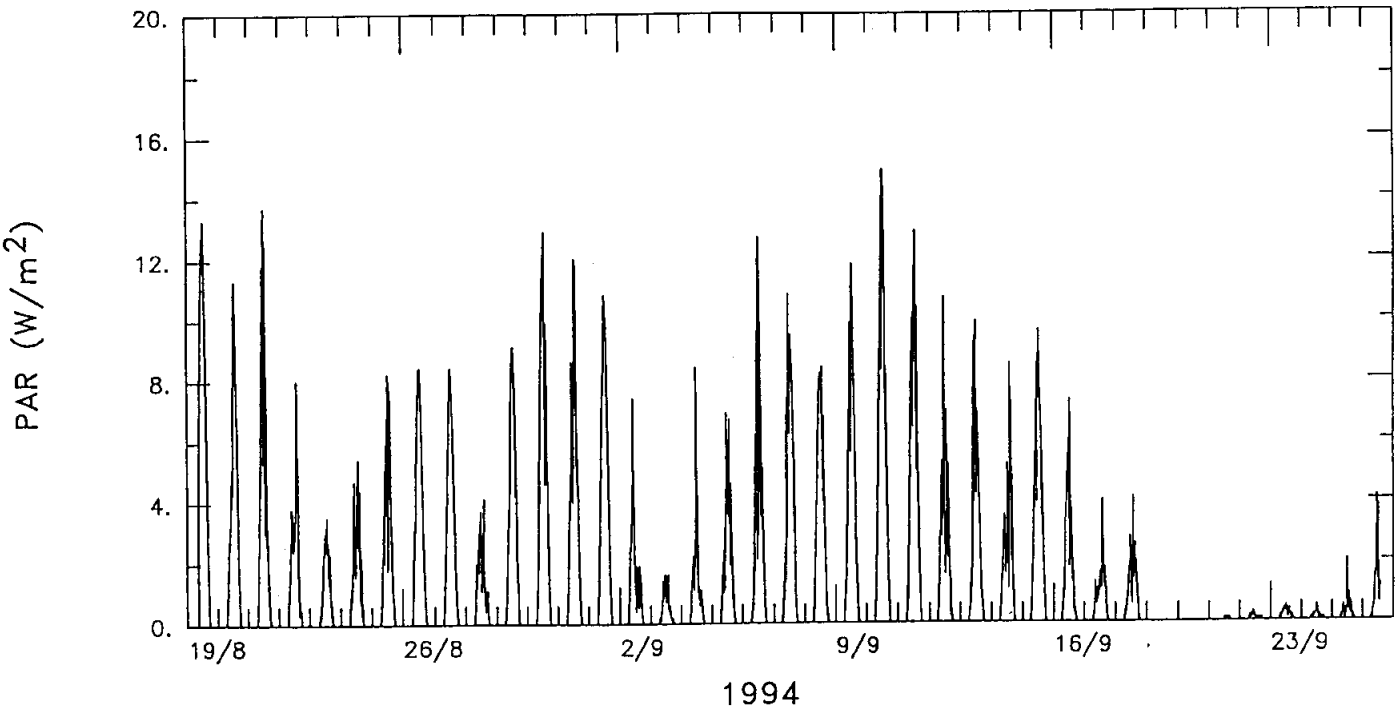
P7 SITE 5, IN AIR. LIGHTMETER 92407
POSITION 38° 15.98'(S) 144° 39.95'(E) QUEENSCLIFF MARINE STATION
INSTRUMENT HEIGHT ABOVE SEA LEVEL 8 metres
PERIOD 19/08/94 - 27/09/94

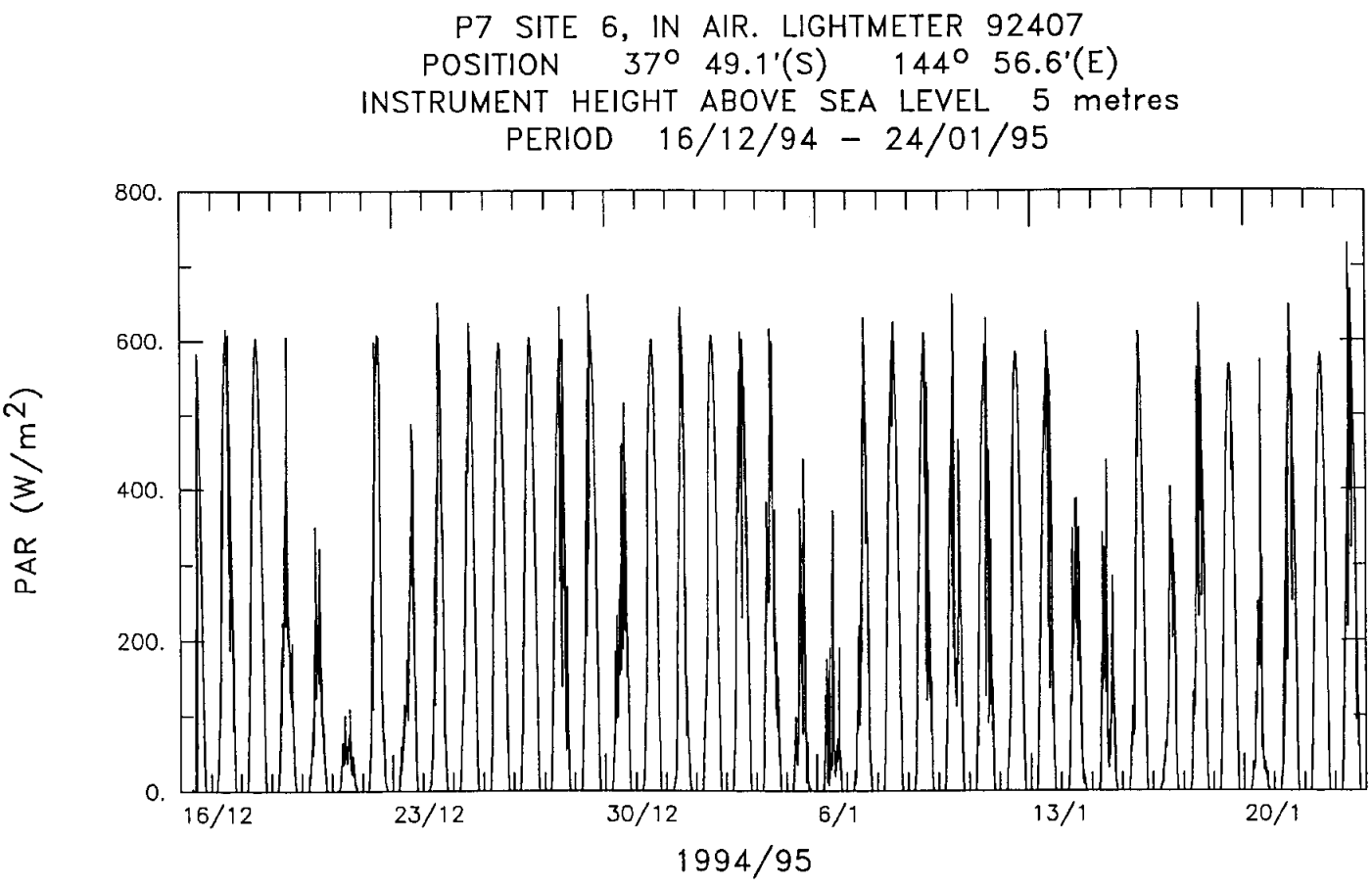


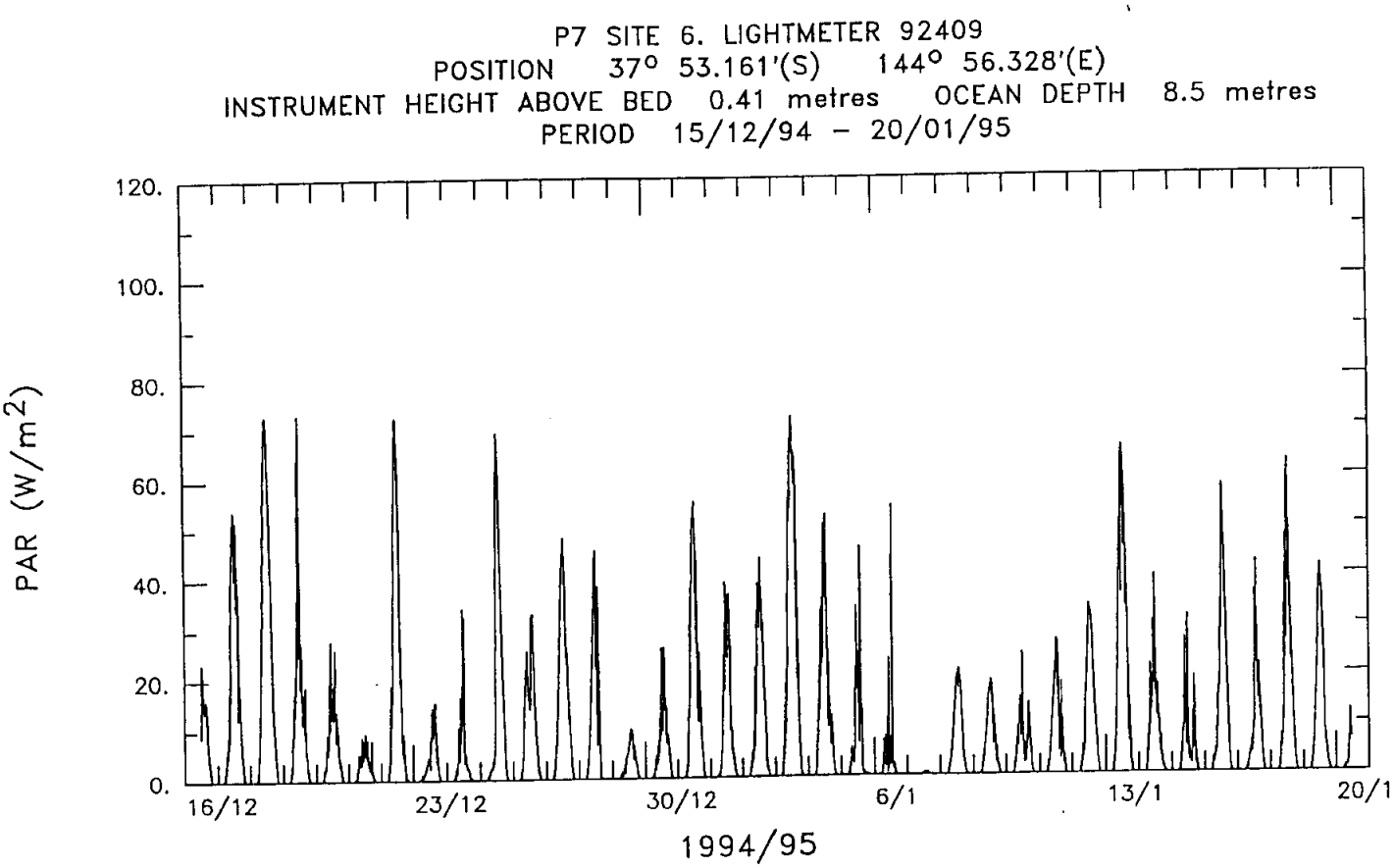
P7 SITE 5. LIGHTMETER 92409
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 0.40 metres OCEAN DEPTH 14.6 metres
PERIOD 19/08/94 - 26/09/94



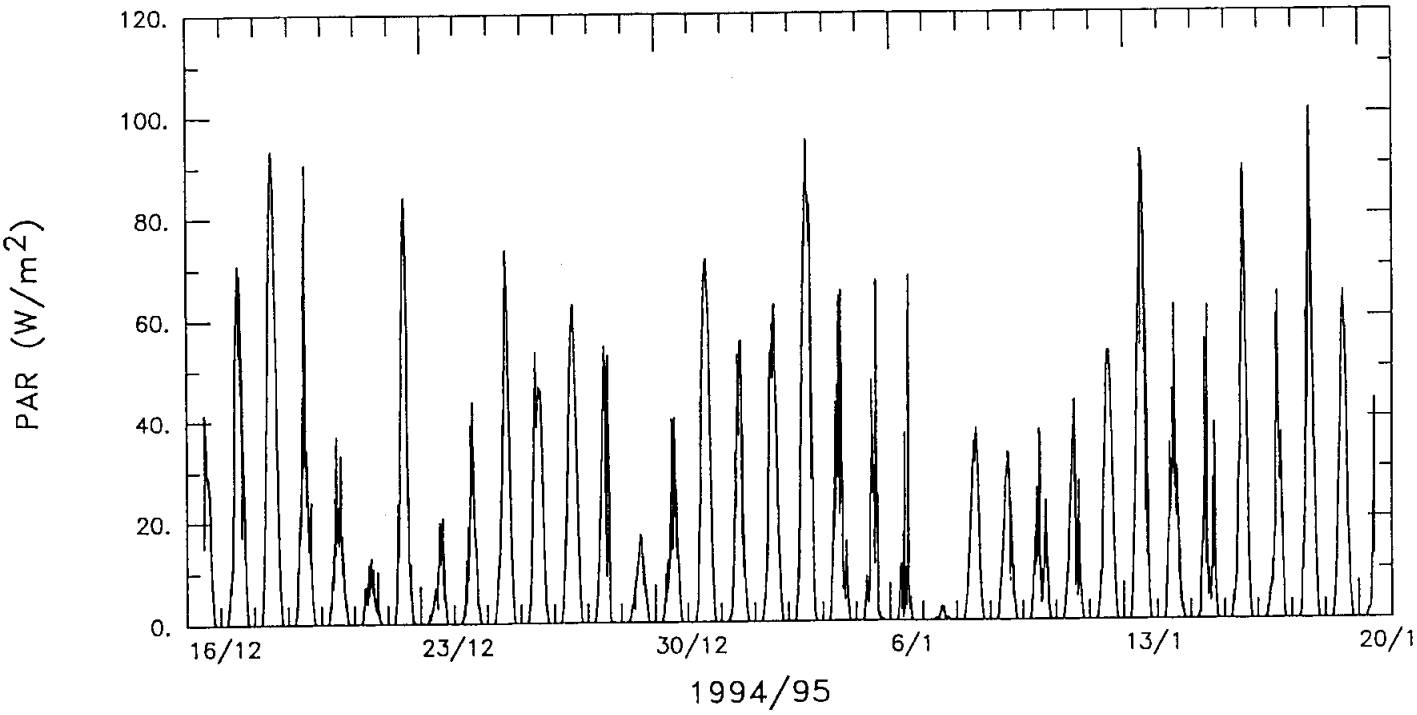
P7 SITE 5. LIGHTMETER 92408
POSITION 37° 58.273'(S) 144° 59.029'(E)
INSTRUMENT HEIGHT ABOVE BED 1.86 metres OCEAN DEPTH 14.6 metres
PERIOD 19/08/94 - 26/09/94



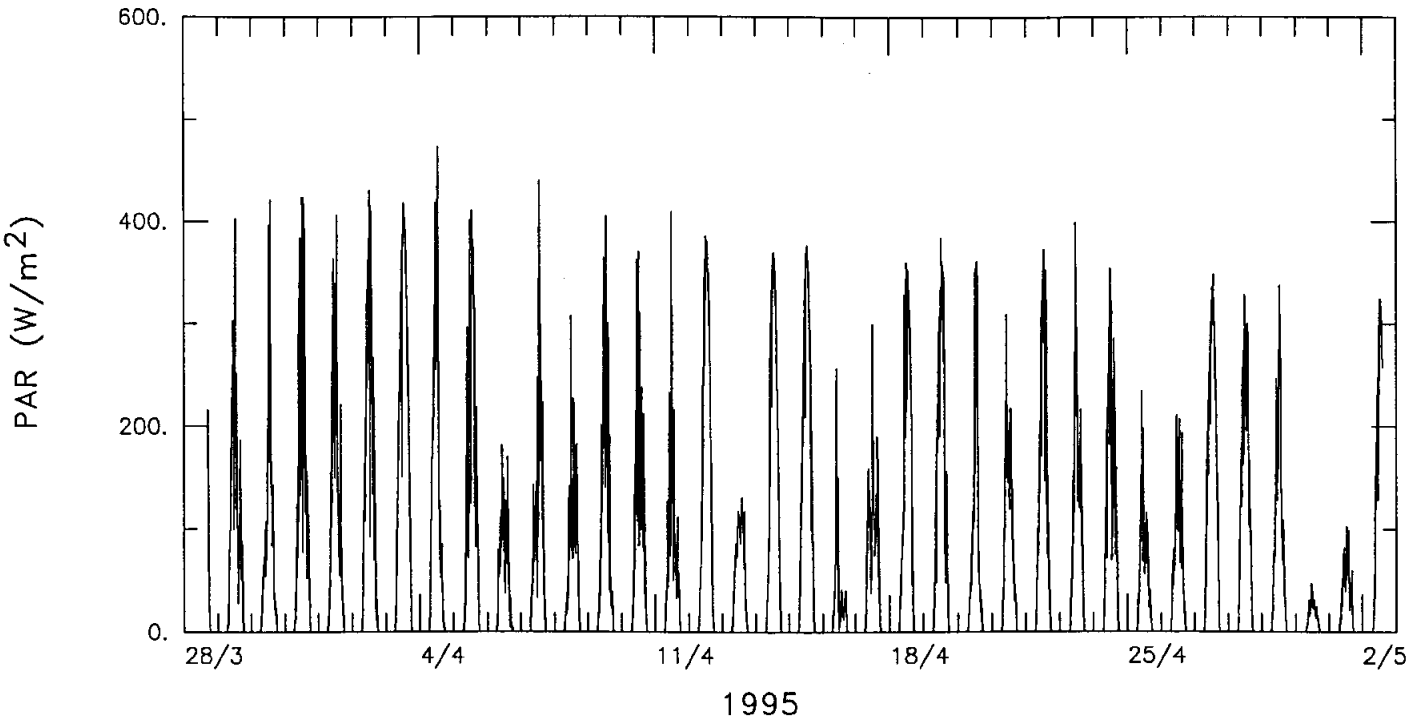

P7 SITE 6, IN AIR. LIGHTMETER 92407
POSITION 37° 49.1'(S) 144° 56.6'(E)
INSTRUMENT HEIGHT ABOVE SEA LEVEL 5 metres
PERIOD 16/12/94 - 24/01/95
PAR (W/m2)
800.
600.
400.
200.
0.
16/12
23/12
30/12
6/1
13/1
20/1
1994/95


P7 SITE 6. LIGHTMETER 92409
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 0.41 metres OCEAN DEPTH 8.5 metres
PERIOD 15/12/94 - 20/01/95
PAR (W/m2)
120.
100.
80.
60.
40.
20.
0.
16/12
23/12
30/12
6/1
13/1
20/1
1994/95

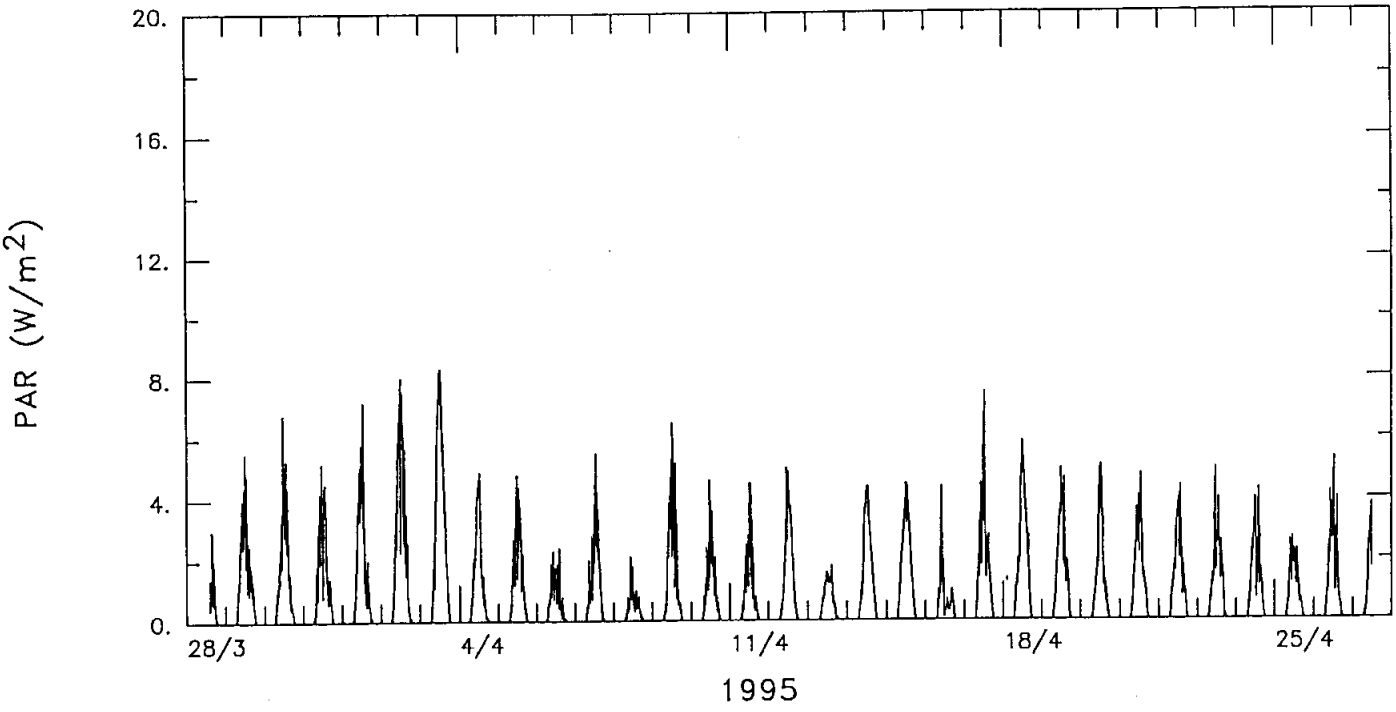
P7 SITE 6. LIGHTMETER 92408
POSITION 37° 53.161'(S) 144° 56.328'(E)
INSTRUMENT HEIGHT ABOVE BED 1.80 metres OCEAN DEPTH 8.5 metres
PERIOD 15/12/94 - 20/01/95



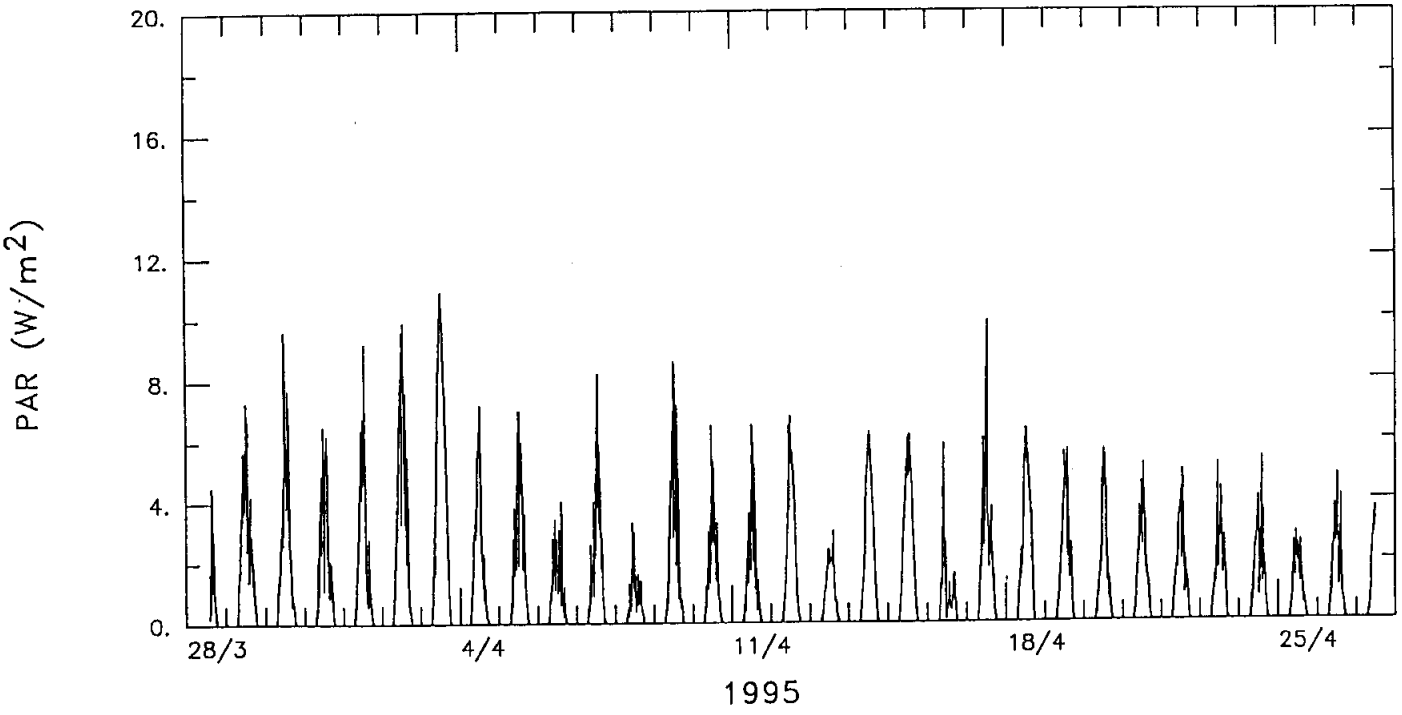
P7 SITE 7, IN AIR. LIGHTMETER 92407
POSITION 37° 56.817'(S) 144° 59.666'(E) SANDRINGHAM YC
INSTRUMENT HEIGHT ABOVE SEA LEVEL 10 metres
PERIOD 28/03/95 - 2/05/95



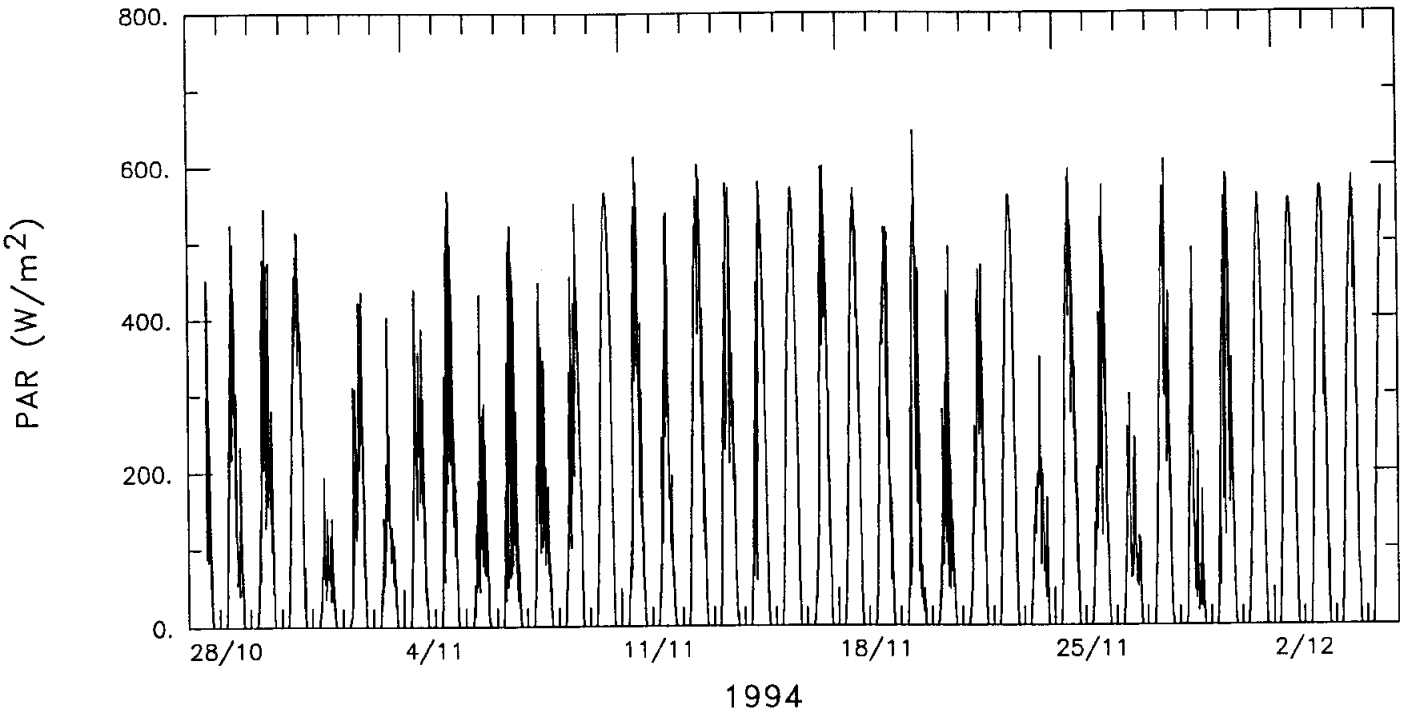
P7 SITE 7. LIGHTMETER 92409
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 0.41 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/93 - 27/04/95



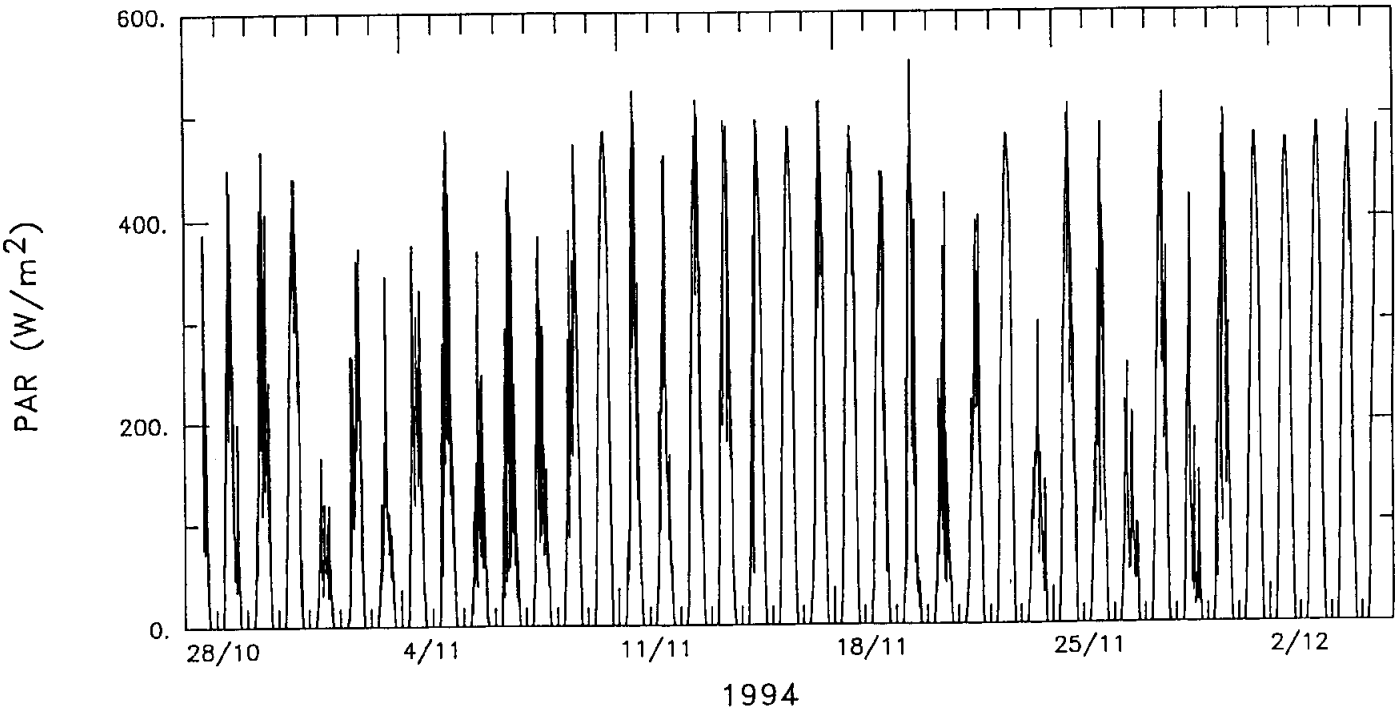
P7 SITE 7. LIGHTMETER 92408
POSITION 38° 0.447'(S) 144° 52.695'(E)
INSTRUMENT HEIGHT ABOVE BED 1.81 metres OCEAN DEPTH 15.6 metres
PERIOD 28/03/95 - 27/04/95



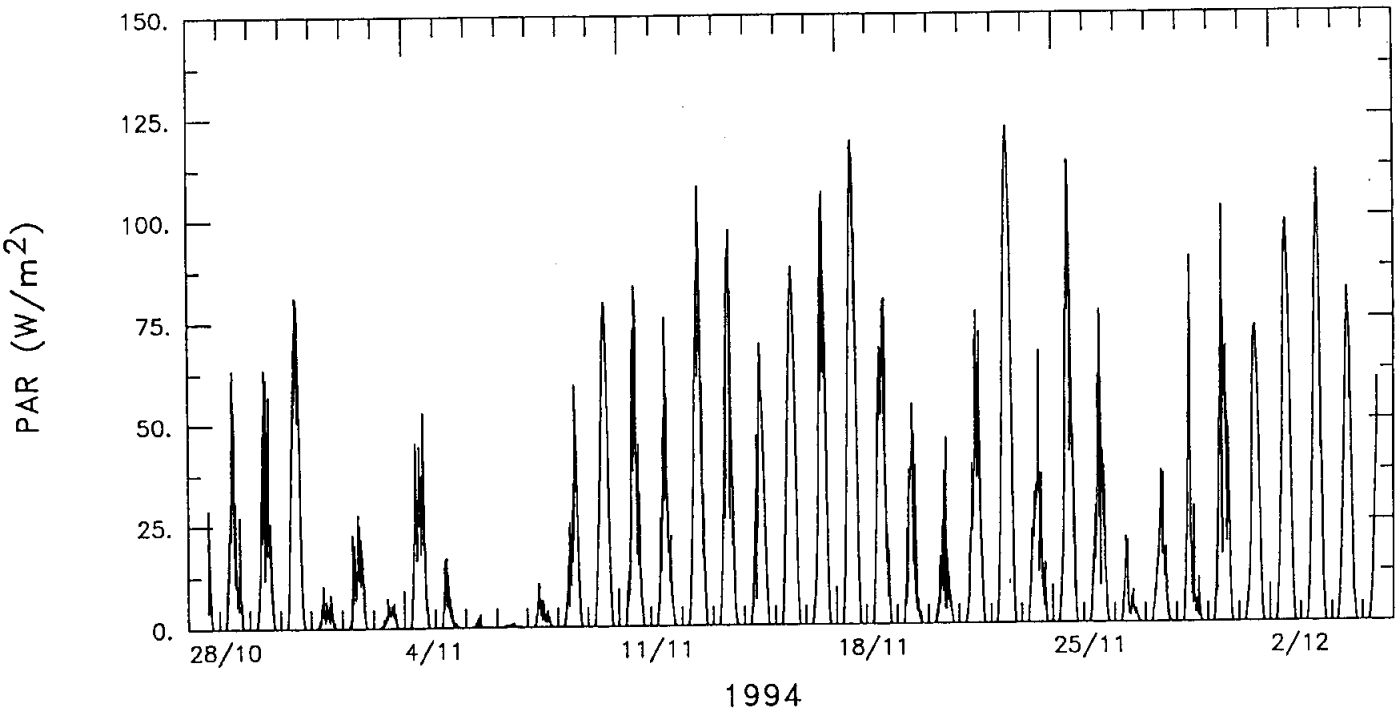
P7 SITE 8, IN AIR. LIGHTMETER 92407
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE SEA LEVEL 1 metres OCEAN DEPTH 5.1 metres
PERIOD 28/10/94 - 5/12/94



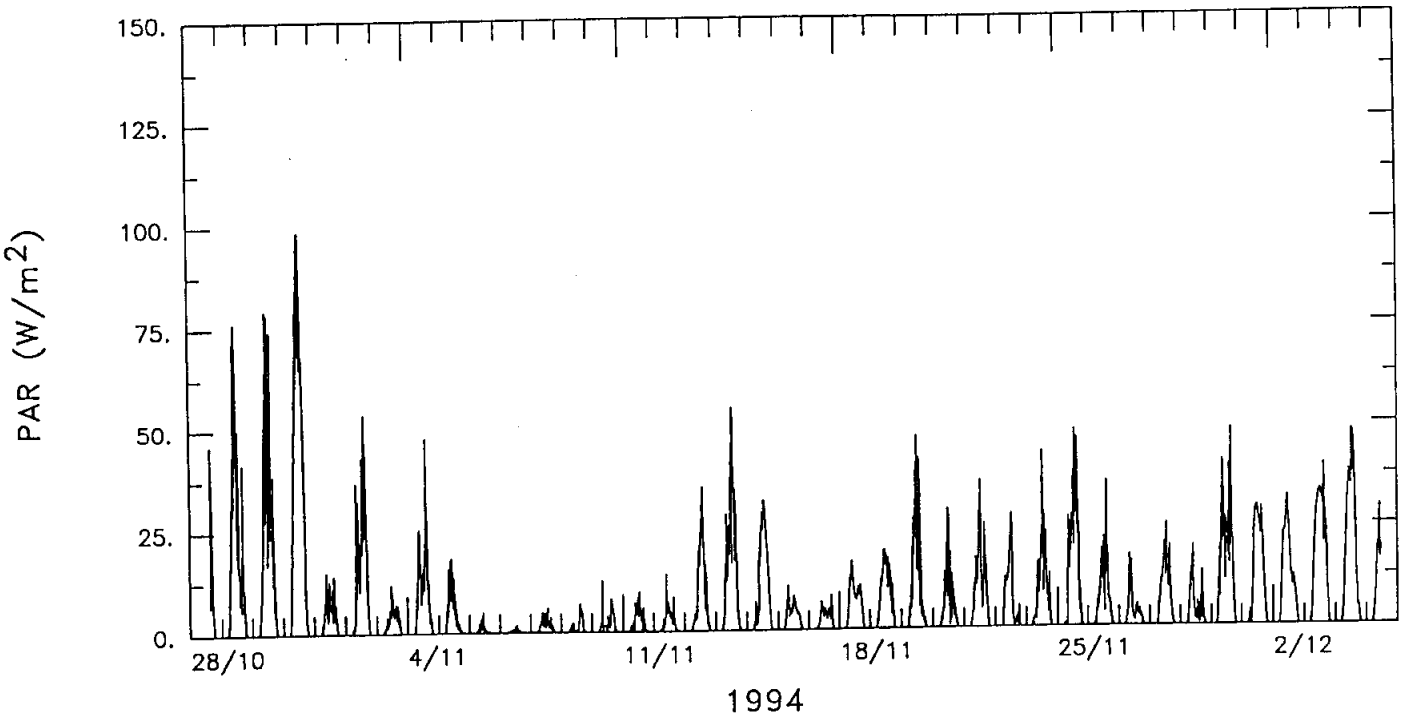
P7 SITE 8, IN AIR. LIGHTMETER 92407
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE SEA LEVEL 1 metres OCEAN DEPTH 5.1 metres
PERIOD 28/10/94 - 5/12/94



P7 SITE 8. LIGHTMETER 92409
POSITION 37° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 0.43 metres OCEAN DEPTH 5.1 metres
PERIOD 28/10/94 - 5/12/94



P7 SITE 8. LIGHTMETER 92408
POSITION 38° 1.606'(S) 144° 37.280'(E)
INSTRUMENT HEIGHT ABOVE BED 1.80 metres OCEAN DEPTH 5.1 metres
PERIOD 28/10/94 - 5/12/94

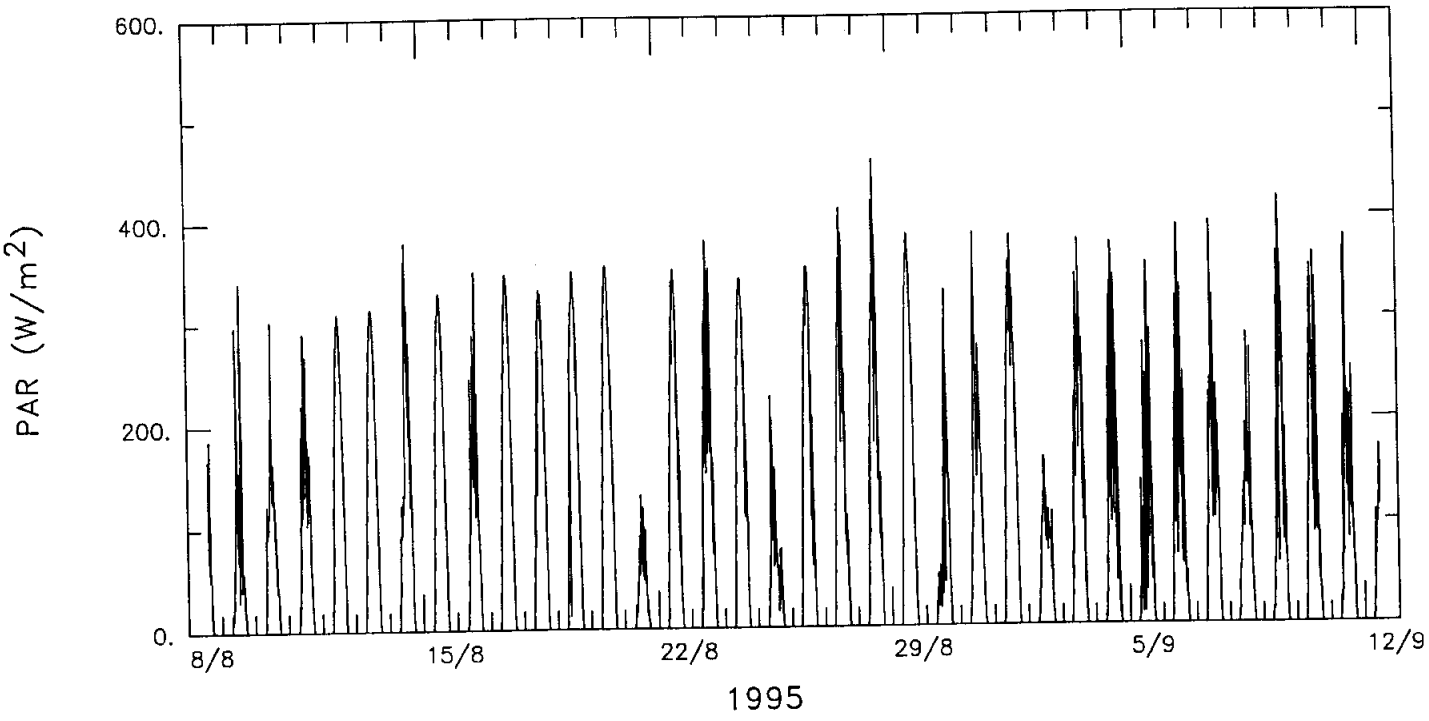


P7 SITE 9, IN AIR. LIGHTMETER 92407

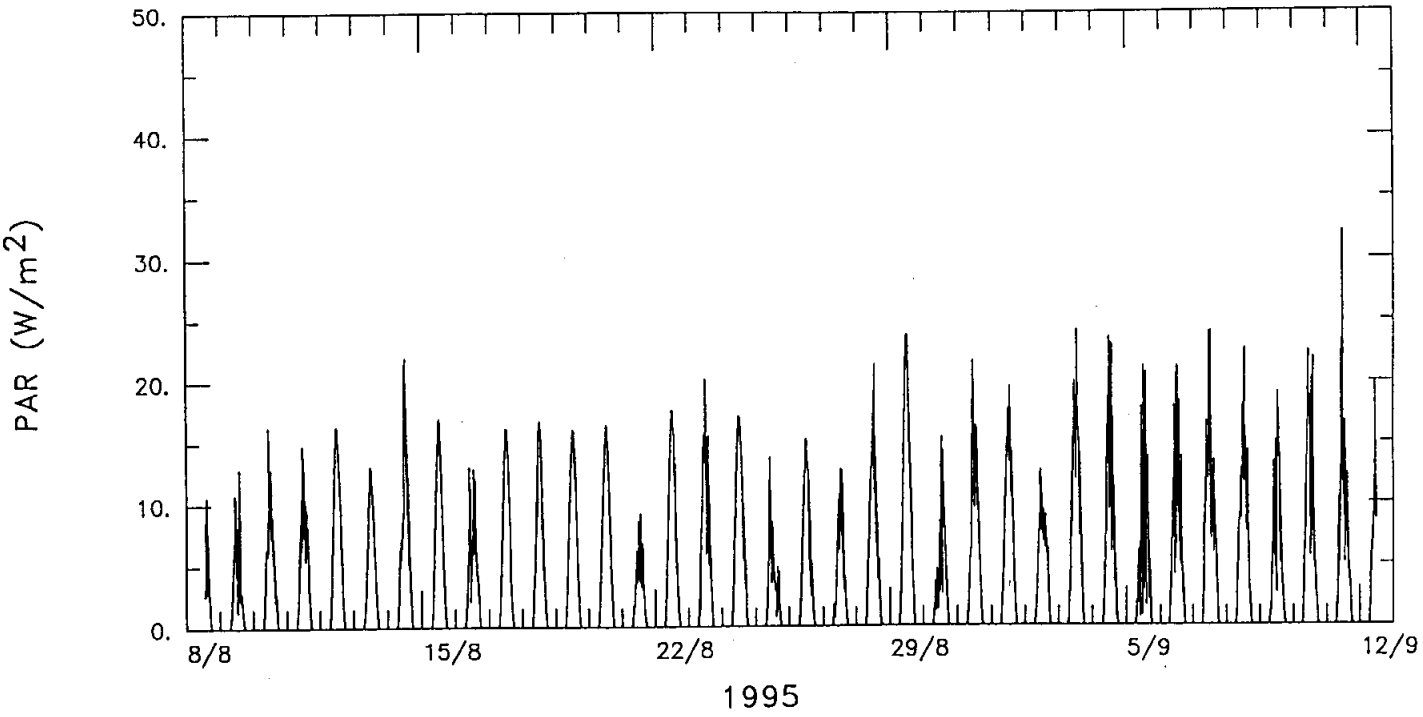
POSITION 37° 7.50'(S) 144° 23.23'(E) HOPETOUN CHANNEL, PILE 13

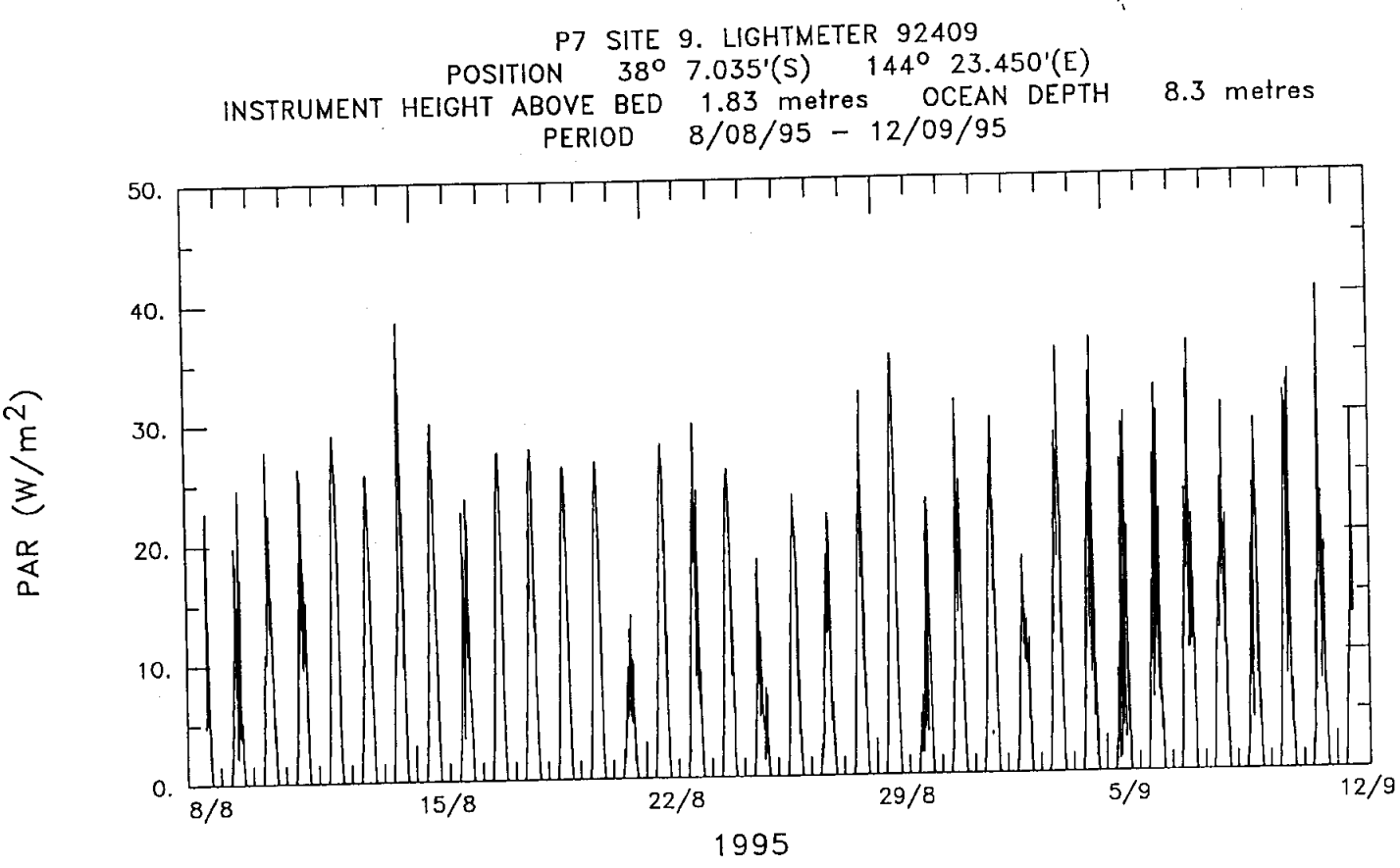
INSTRUMENT HEIGHT ABOVE SEA LEVEL 5 metres

PERIOD 8/08/95 – 12/09/95



P7 SITE 9. LIGHTMETER 92408
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 0.37 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 - 12/09/95




P7 SITE 9. LIGHTMETER 92409
POSITION 38° 7.035'(S) 144° 23.450'(E)
INSTRUMENT HEIGHT ABOVE BED 1.83 metres OCEAN DEPTH 8.3 metres
PERIOD 8/08/95 - 12/09/95
PAR (W/m2)
50.
40.
30.
20.
10.
0.
8/8
15/8
22/8
29/8
5/9
12/9
1995

6.5. Appendix 5 - Grain size analyses

Where sufficient sediment was available for grain size analysis following calibration of the OBS sensors, a settling tube analysis for grain size and fall velocity was performed. Only three diver collected samples were analysed.

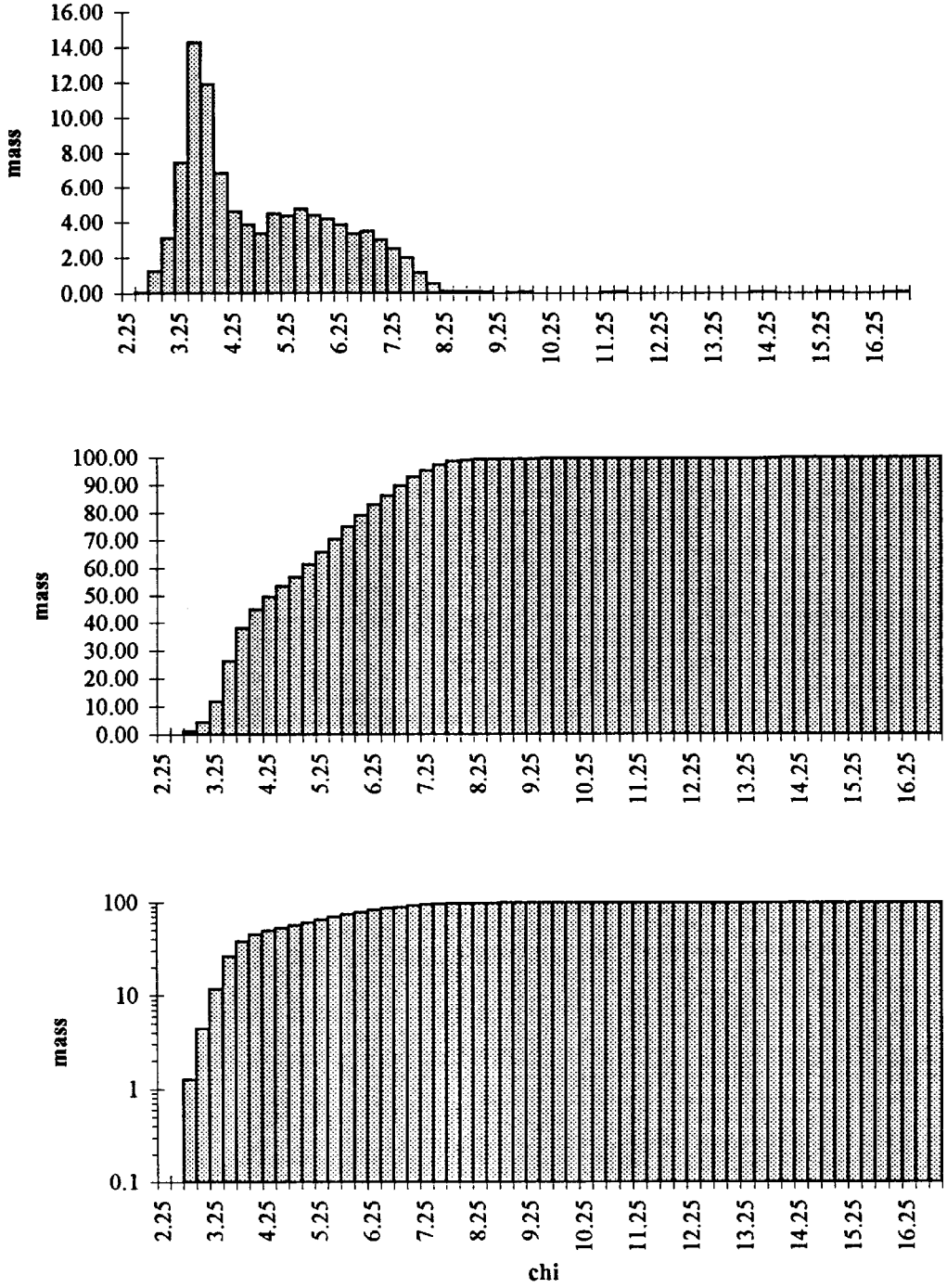
SEDCAM site 1 - Patterson River

Temperature = 20.00 *Salinity = 35.00*

Settling velocity		Mass	Grain size		Mass	Standard sett. vel.		Mass
mm/s	chi	(%)	mm	phi	(%)	mm/s	chi	(%)
210.22	2.25	0.00	1.41	-0.50	0.00	210.22	2.25	0.00
176.78	2.50	0.04	1.19	-0.25	0.12	176.78	2.50	0.04
148.65	2.75	1.27	1.00	0.00	1.20	148.65	2.75	1.27
125.00	3.00	4.39	0.84	0.25	3.98	125.00	3.00	4.39
105.11	3.25	11.84	0.71	0.50	10.83	105.11	3.25	11.84
88.39	3.50	26.08	0.59	0.75	25.51	88.39	3.50	26.08
74.33	3.75	37.99	0.50	1.00	38.35	74.33	3.75	37.99
62.50	4.00	44.87	0.42	1.25	45.85	62.50	4.00	44.87
52.56	4.25	49.52	0.35	1.50	51.20	52.56	4.25	49.52
44.19	4.50	53.40	0.30	1.75	55.66	44.19	4.50	53.40
37.16	4.75	56.78	0.25	2.00	61.54	37.16	4.75	56.78
31.25	5.00	61.31	0.21	2.25	68.03	31.25	5.00	61.31
26.28	5.25	65.69	0.18	2.50	74.84	26.28	5.25	65.69
22.10	5.50	70.45	0.15	2.75	81.39	22.10	5.50	70.45
18.58	5.75	74.88	0.13	3.00	87.16	18.58	5.75	74.88
15.63	6.00	79.07	0.11	3.25	92.74	15.63	6.00	79.07
13.14	6.25	82.96	0.09	3.50	97.00	13.14	6.25	82.96
11.05	6.50	86.33	0.07	3.75	98.93	11.05	6.50	86.33
9.29	6.75	89.83	0.06	4.00	99.22	9.29	6.75	89.83
7.81	7.00	92.86	0.05	4.25	99.43	7.81	7.00	92.86
6.57	7.25	95.36	0.04	4.50	99.46	6.57	7.25	95.36
5.52	7.50	97.36	0.04	4.75	99.57	5.52	7.50	97.36
4.65	7.75	98.52	0.03	5.00	99.57	4.65	7.75	98.52
3.91	8.00	99.06	0.03	5.25	99.57	3.91	8.00	99.06
3.28	8.25	99.18	0.02	5.50	99.63	3.28	8.25	99.18
2.76	8.50	99.28	0.02	5.75	99.68	2.76	8.50	99.28
2.32	8.75	99.39	0.02	6.00	99.68	2.32	8.75	99.39
1.95	9.00	99.46	0.01	6.25	99.68	1.95	9.00	99.46
1.64	9.25	99.46	0.01	6.50	99.68	1.64	9.25	99.46
1.38	9.50	99.50	0.01	6.75	99.68	1.38	9.50	99.50
1.16	9.75	99.57	0.01	7.00	99.78	1.16	9.75	99.57
0.98	10.00	99.57	0.01	7.25	99.78	0.98	10.00	99.57
0.82	10.25	99.57	0.01	7.50	99.84	0.82	10.25	99.57
0.69	10.50	99.57	0.00	7.75	99.89	0.69	10.50	99.57
0.58	10.75	99.57	0.00	8.00	99.89	0.58	10.75	99.57
0.49	11.00	99.57	0.00	8.25	100.00	0.49	11.00	99.57
0.41	11.25	99.61				0.41	11.25	99.61
0.35	11.50	99.68				0.35	11.50	99.68
0.29	11.75	99.68				0.29	11.75	99.68
0.24	12.00	99.68				0.24	12.00	99.68
0.21	12.25	99.68				0.21	12.25	99.68
0.17	12.50	99.68				0.17	12.50	99.68
0.15	12.75	99.68				0.15	12.75	99.68
0.12	13.00	99.68				0.12	13.00	99.68
0.10	13.25	99.68				0.10	13.25	99.68
0.09	13.50	99.68				0.09	13.50	99.68
0.07	13.75	99.68				0.07	13.75	99.68
0.06	14.00	99.72				0.06	14.00	99.72
0.05	14.25	99.78				0.05	14.25	99.78
0.04	14.50	99.78				0.04	14.50	99.78
0.04	14.75	99.78				0.04	14.75	99.78
0.03	15.00	99.78				0.03	15.00	99.78
0.03	15.25	99.83				0.03	15.25	99.83
0.02	15.50	99.89				0.02	15.50	99.89
0.02	15.75	99.89				0.02	15.75	99.89
0.02	16.00	99.89				0.02	16.00	99.89
0.01	16.25	99.89				0.01	16.25	99.89
0.01	16.50	99.93				0.01	16.50	99.93

Settling velocity analysis

SEDCAM site 1 - Patterson River

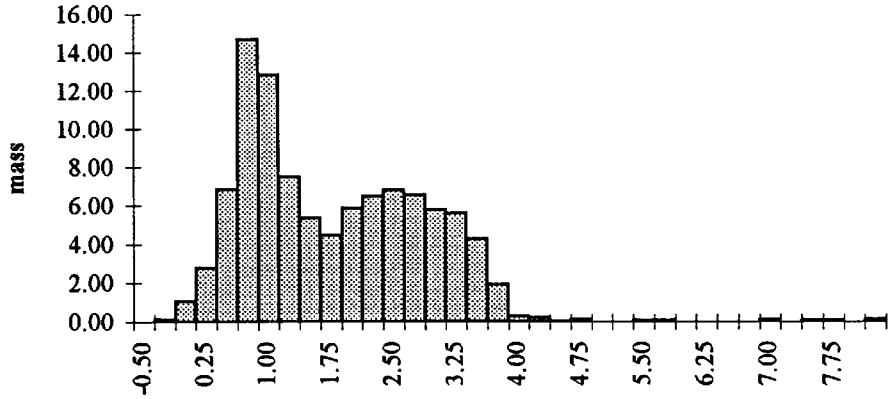


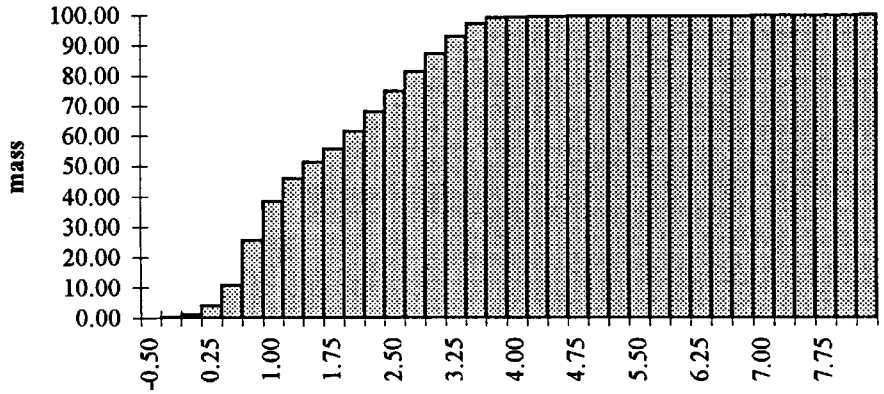
Statistical summary of results

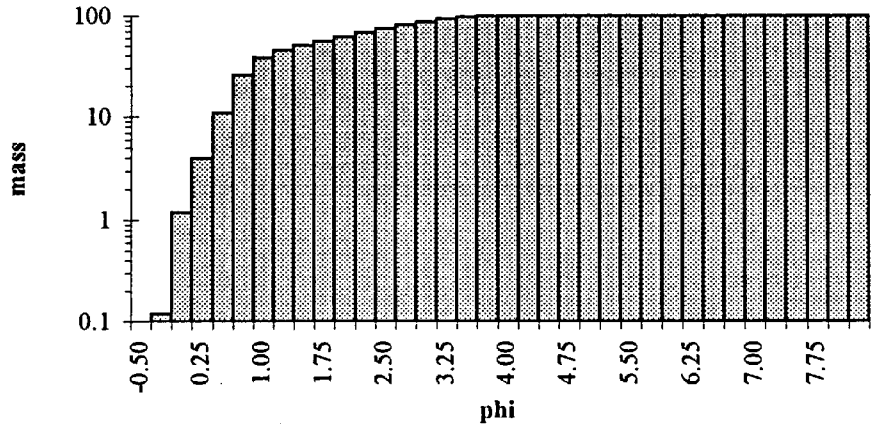
	Mean	Sorting	Skewness	Kurtosis
chi	4.70	1.53	1.55	6.59
mm/s	*38.35*	*345.66*	*341.13*	*10.36*
	χ_{35}	χ_{50}	χ_{65}	
chi	3.69	4.28	5.21	
mm/s	*77.63*	*51.44*	*27.01*	

Grain size analysis

SEDCAM site 1 - Patterson River







Statistical summary of results

	Mean	Sorting	Skewness	Kurtosis
phi	1.65	1.09	0.77	1.37
mm	*0.32*	*0.47*	*0.58*	*0.39*
	ϕ_{35}	ϕ_{50}	ϕ_{65}	
phi	0.93	1.44	2.13	
mm	*0.52*	*0.37*	*0.23*	

Textural description

Gravel	Sand	Silt	Clay
0.00%	99.22%	0.67%	0.11%

Poorly sorted, very positively skewed and leptokurtic

Victorian Institute of Marine Sciences

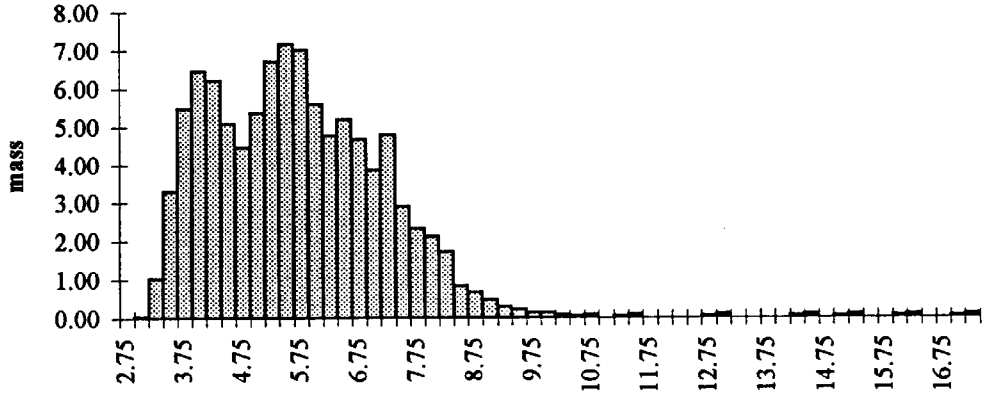
SEDCAM site 5 - Red Bluff

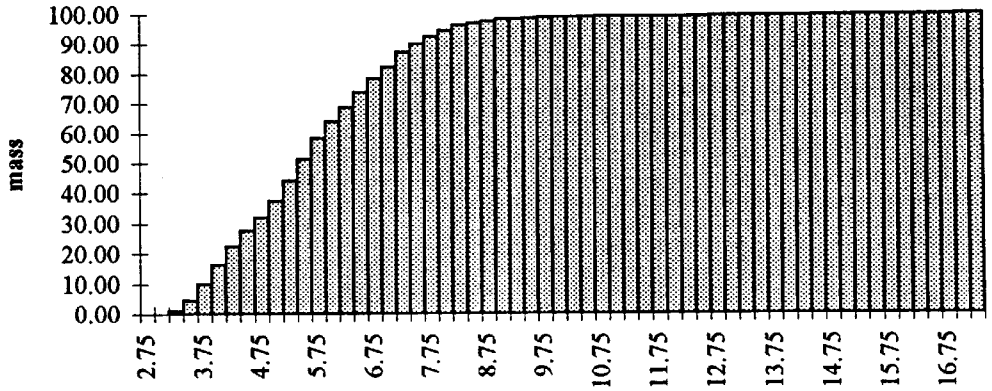
Temperature = 20.00 *Salinity = 35.00*

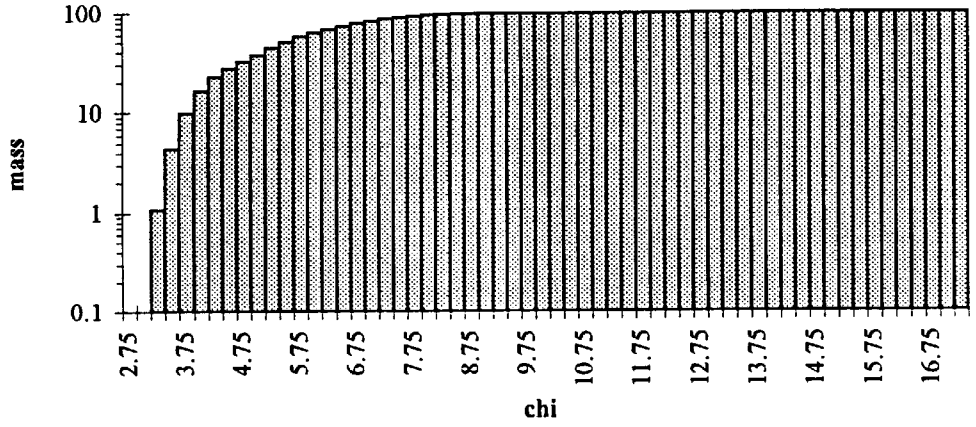
Settling velocity		Mass	Grain size		Mass	Standard sett. vel.		Mass
mm/s	chi	(%)	mm	phi	(%)	mm/s	chi	(%)
148.65	2.75	0.00	0.84	0.25	0.00	148.65	2.75	0.00
125.00	3.00	0.04	0.71	0.50	0.88	125.00	3.00	0.04
105.11	3.25	1.08	0.59	0.75	4.10	105.11	3.25	1.08
88.39	3.50	4.38	0.50	1.00	10.12	88.39	3.50	4.38
74.33	3.75	9.85	0.42	1.25	17.50	74.33	3.75	9.85
62.50	4.00	16.30	0.35	1.50	24.56	62.50	4.00	16.30
52.56	4.25	22.51	0.30	1.75	30.48	52.56	4.25	22.51
44.19	4.50	27.58	0.25	2.00	37.55	44.19	4.50	27.58
37.16	4.75	32.03	0.21	2.25	47.28	37.16	4.75	32.03
31.25	5.00	37.39	0.18	2.50	57.88	31.25	5.00	37.39
26.28	5.25	44.08	0.15	2.75	66.13	26.28	5.25	44.08
22.10	5.50	51.24	0.13	3.00	74.50	22.10	5.50	51.24
18.58	5.75	58.24	0.11	3.25	81.70	18.58	5.75	58.24
15.63	6.00	63.82	0.09	3.50	89.08	15.63	6.00	63.82
13.14	6.25	68.57	0.07	3.75	93.30	13.14	6.25	68.57
11.05	6.50	73.76	0.06	4.00	96.49	11.05	6.50	73.76
9.29	6.75	78.42	0.05	4.25	97.81	9.29	6.75	78.42
7.81	7.00	82.27	0.04	4.50	98.45	7.81	7.00	82.27
6.57	7.25	87.05	0.04	4.75	98.79	6.57	7.25	87.05
5.52	7.50	89.95	0.03	5.00	98.99	5.52	7.50	89.95
4.65	7.75	92.28	0.03	5.25	99.14	4.65	7.75	92.28
3.91	8.00	94.39	0.02	5.50	99.21	3.91	8.00	94.39
3.28	8.25	96.12	0.02	5.75	99.28	3.28	8.25	96.12
2.76	8.50	96.94	0.02	6.00	99.28	2.76	8.50	96.94
2.32	8.75	97.61	0.01	6.25	99.35	2.32	8.75	97.61
1.95	9.00	98.09	0.01	6.50	99.42	1.95	9.00	98.09
1.64	9.25	98.38	0.01	6.75	99.42	1.64	9.25	98.38
1.38	9.50	98.61	0.01	7.00	99.49	1.38	9.50	98.61
1.16	9.75	98.76	0.01	7.25	99.57	1.16	9.75	98.76
0.98	10.00	98.90	0.01	7.50	99.71	0.98	10.00	98.90
0.82	10.25	98.99	0.00	7.75	99.71	0.82	10.25	98.99
0.69	10.50	99.05	0.00	8.00	99.86	0.69	10.50	99.05
0.58	10.75	99.14	0.00	8.25	99.86	0.58	10.75	99.14
0.49	11.00	99.14	0.00	8.50	100.00	0.49	11.00	99.14
0.41	11.25	99.19				0.41	11.25	99.19
0.35	11.50	99.28				0.35	11.50	99.28
0.29	11.75	99.28				0.29	11.75	99.28
0.24	12.00	99.28				0.24	12.00	99.28
0.21	12.25	99.28				0.21	12.25	99.28
0.17	12.50	99.28				0.17	12.50	99.28
0.15	12.75	99.33				0.15	12.75	99.33
0.12	13.00	99.42				0.12	13.00	99.42
0.10	13.25	99.42				0.10	13.25	99.42
0.09	13.50	99.42				0.09	13.50	99.42
0.07	13.75	99.42				0.07	13.75	99.42
0.06	14.00	99.42				0.06	14.00	99.42
0.05	14.25	99.48				0.05	14.25	99.48
0.04	14.50	99.57				0.04	14.50	99.57
0.04	14.75	99.57				0.04	14.75	99.57
0.03	15.00	99.62				0.03	15.00	99.62
0.03	15.25	99.71				0.03	15.25	99.71
0.02	15.50	99.71				0.02	15.50	99.71
0.02	15.75	99.71				0.02	15.75	99.71
0.02	16.00	99.77				0.02	16.00	99.77
0.01	16.25	99.86				0.01	16.25	99.86
0.01	16.50	99.86				0.01	16.50	99.86
0.01	16.75	99.86				0.01	16.75	99.86
0.01	17.00	99.91				0.01	17.00	99.91

Settling velocity analysis

SEDCAM site 5 - Red Bluff





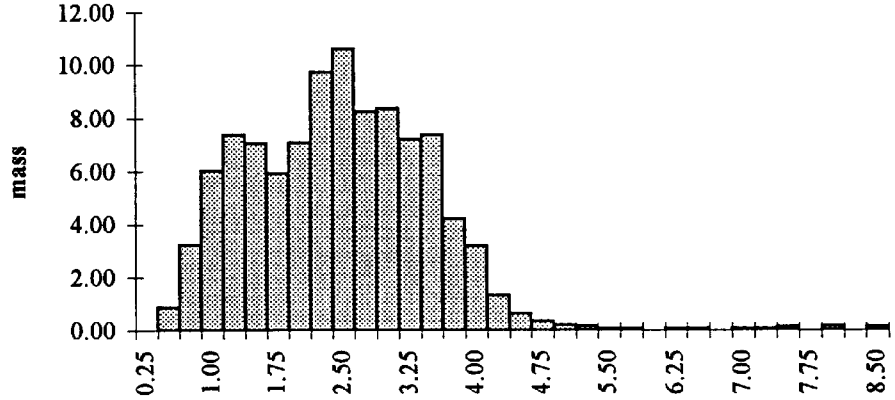


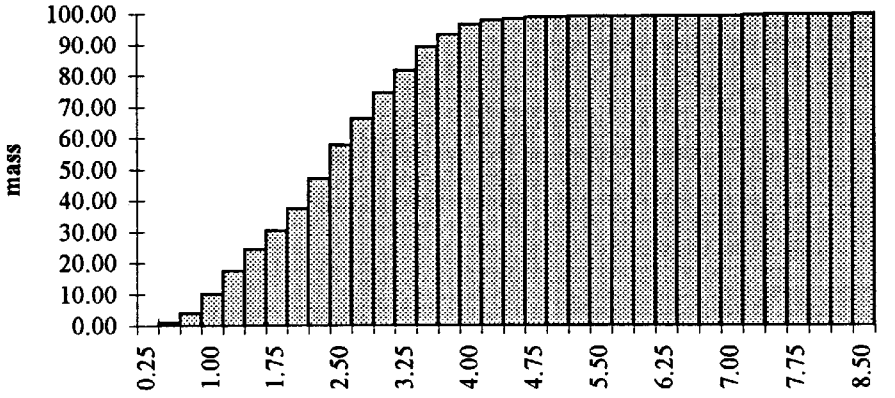
Statistical summary of results

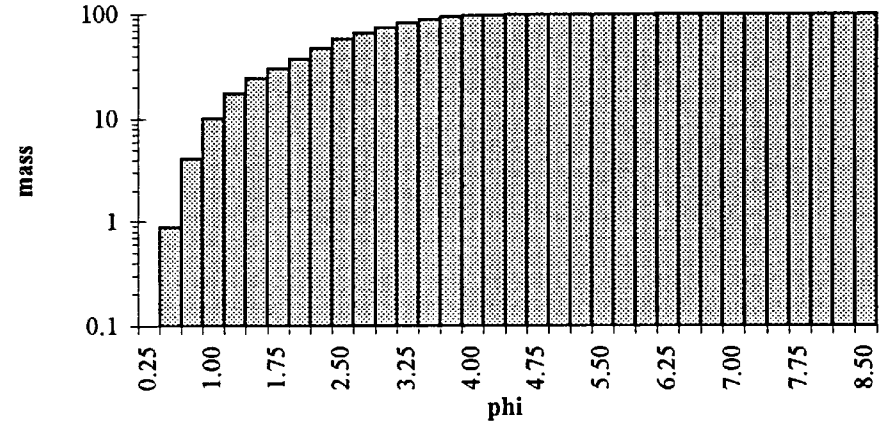
	Mean	Sorting	Skewness	Kurtosis
chi	5.62	1.65	1.66	7.37
mm/s	*20.39*	*319.49*	*315.62*	*6.05*
	χ_{35}	χ_{50}	χ_{65}	
chi	4.89	5.46	6.06	
mm/s	*33.76*	*22.77*	*14.97*	

Grain size analysis

SEDCAM site 5 - Red Bluff







Statistical summary of results

	Mean	Sorting	Skewness	Kurtosis
phi	2.33	1.06	0.83	2.72
mm	*0.20*	*0.48*	*0.56*	*0.15*
	ϕ_{35}	ϕ_{50}	ϕ_{65}	
phi	1.91	2.31	2.72	
mm	*0.27*	*0.20*	*0.15*	

Textural description

Gravel	Sand	Silt	Clay
0.00%	96.49%	3.37%	0.14%

Poorly sorted, very positively skewed and very leptokurtic

Victorian Institute of Marine Sciences

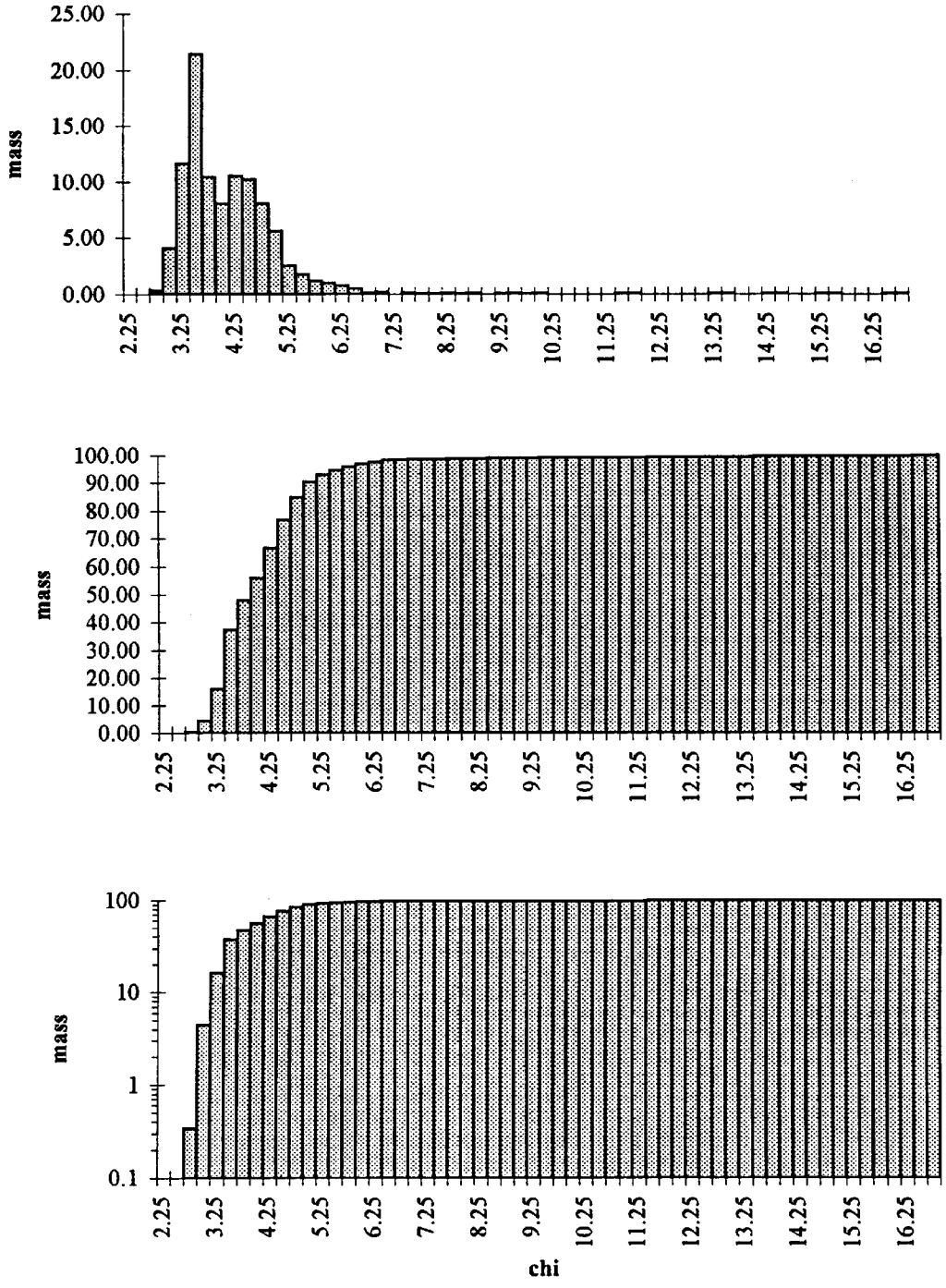
SEDCAM site 6 - Yarra River

Temperature = 20.00 *Salinity = 35.00*

Settling velocity		Mass	Grain size		Mass	Standard sett. vel.		Mass
mm/s	chi	(%)	mm	phi	(%)	mm/s	chi	(%)
210.22	2.25	0.00	1.41	-0.50	0.00	210.22	2.25	0.00
176.78	2.50	0.01	1.19	-0.25	0.02	176.78	2.50	0.01
148.65	2.75	0.34	1.00	0.00	0.25	148.65	2.75	0.34
125.00	3.00	4.44	0.84	0.25	3.82	125.00	3.00	4.44
105.11	3.25	16.07	0.71	0.50	14.51	105.11	3.25	16.07
88.39	3.50	37.47	0.59	0.75	36.96	88.39	3.50	37.47
74.33	3.75	47.92	0.50	1.00	48.29	74.33	3.75	47.92
62.50	4.00	55.95	0.42	1.25	58.09	62.50	4.00	55.95
52.56	4.25	66.51	0.35	1.50	70.89	52.56	4.25	66.51
44.19	4.50	76.76	0.30	1.75	82.55	44.19	4.50	76.76
37.16	4.75	84.80	0.25	2.00	90.53	37.16	4.75	84.80
31.25	5.00	90.40	0.21	2.25	93.83	31.25	5.00	90.40
26.28	5.25	92.95	0.18	2.50	95.87	26.28	5.25	92.95
22.10	5.50	94.69	0.15	2.75	97.34	22.10	5.50	94.69
18.58	5.75	95.89	0.13	3.00	98.18	18.58	5.75	95.89
15.63	6.00	96.88	0.11	3.25	98.48	15.63	6.00	96.88
13.14	6.25	97.66	0.09	3.50	98.63	13.14	6.25	97.66
11.05	6.50	98.16	0.07	3.75	98.76	11.05	6.50	98.16
9.29	6.75	98.28	0.06	4.00	98.84	9.29	6.75	98.28
7.81	7.00	98.49	0.05	4.25	98.99	7.81	7.00	98.49
6.57	7.25	98.50	0.04	4.50	99.08	6.57	7.25	98.50
5.52	7.50	98.65	0.04	4.75	99.22	5.52	7.50	98.65
4.65	7.75	98.72	0.03	5.00	99.28	4.65	7.75	98.72
3.91	8.00	98.75	0.03	5.25	99.28	3.91	8.00	98.75
3.28	8.25	98.84	0.02	5.50	99.28	3.28	8.25	98.84
2.76	8.50	98.89	0.02	5.75	99.42	2.76	8.50	98.89
2.32	8.75	98.99	0.02	6.00	99.42	2.32	8.75	98.99
1.95	9.00	98.99	0.01	6.25	99.42	1.95	9.00	98.99
1.64	9.25	99.04	0.01	6.50	99.49	1.64	9.25	99.04
1.38	9.50	99.13	0.01	6.75	99.57	1.38	9.50	99.13
1.16	9.75	99.19	0.01	7.00	99.64	1.16	9.75	99.19
0.98	10.00	99.28	0.01	7.25	99.71	0.98	10.00	99.28
0.82	10.25	99.28	0.01	7.50	99.78	0.82	10.25	99.28
0.69	10.50	99.28	0.00	7.75	99.86	0.69	10.50	99.28
0.58	10.75	99.28	0.00	8.00	99.86	0.58	10.75	99.28
0.49	11.00	99.28	0.00	8.25	100.00	0.49	11.00	99.28
0.41	11.25	99.28				0.41	11.25	99.28
0.35	11.50	99.33				0.35	11.50	99.33
0.29	11.75	99.42				0.29	11.75	99.42
0.24	12.00	99.42				0.24	12.00	99.42
0.21	12.25	99.42				0.21	12.25	99.42
0.17	12.50	99.42				0.17	12.50	99.42
0.15	12.75	99.42				0.15	12.75	99.42
0.12	13.00	99.42				0.12	13.00	99.42
0.10	13.25	99.48				0.10	13.25	99.48
0.09	13.50	99.57				0.09	13.50	99.57
0.07	13.75	99.57				0.07	13.75	99.57
0.06	14.00	99.57				0.06	14.00	99.57
0.05	14.25	99.62				0.05	14.25	99.62
0.04	14.50	99.71				0.04	14.50	99.71
0.04	14.75	99.71				0.04	14.75	99.71
0.03	15.00	99.71				0.03	15.00	99.71
0.03	15.25	99.77				0.03	15.25	99.77
0.02	15.50	99.86				0.02	15.50	99.86
0.02	15.75	99.86				0.02	15.75	99.86
0.02	16.00	99.86				0.02	16.00	99.86
0.01	16.25	99.86				0.01	16.25	99.86
0.01	16.50	99.91				0.01	16.50	99.91

Settling velocity analysis

SEDCAM site 6 - Yarra River

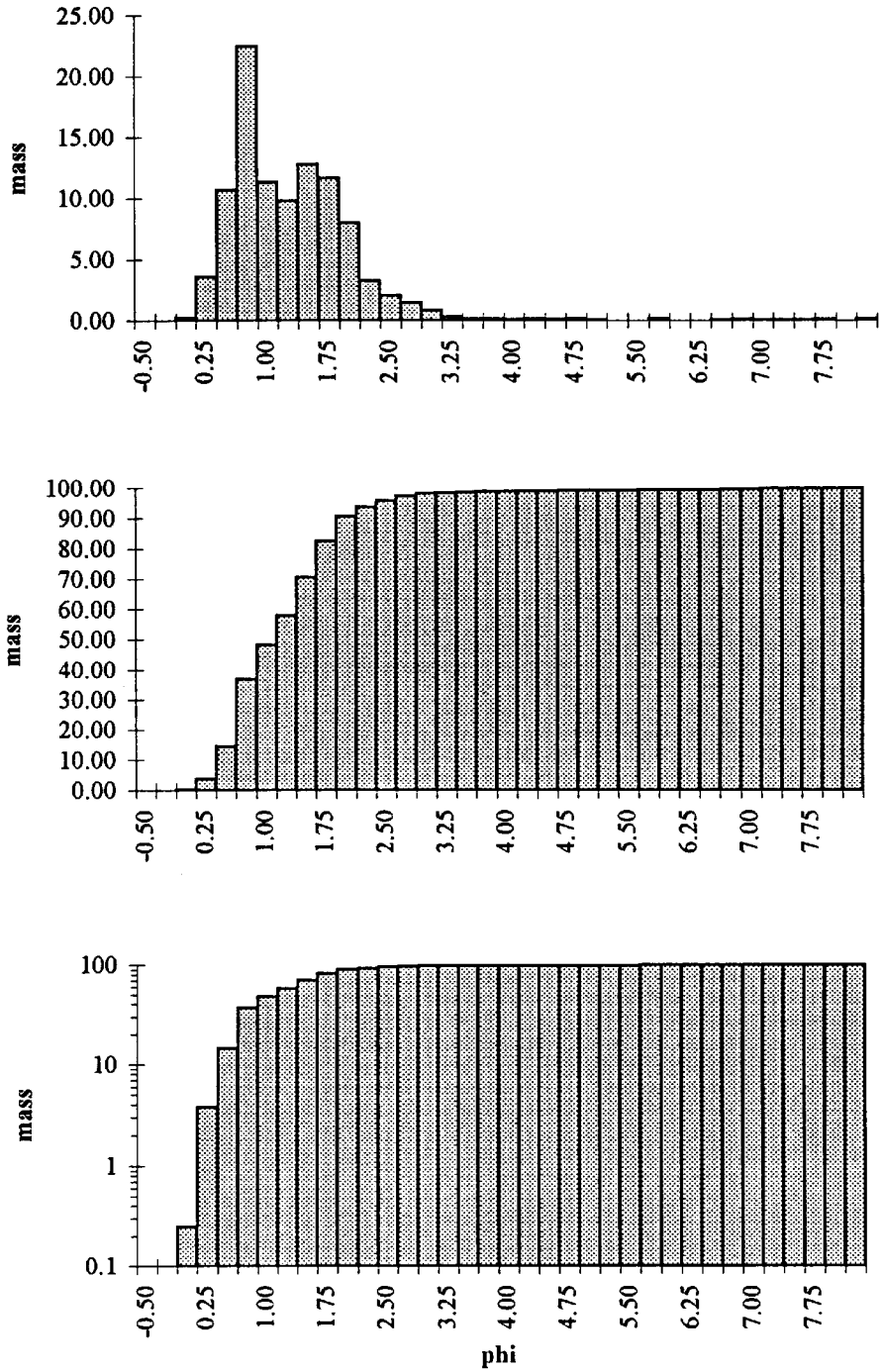


Statistical summary of results

	Mean	Sorting	Skewness	Kurtosis
chi	4.05	1.23	4.87	37.64
mm/s	*60.26*	*425.99*	*34.31*	*0.00*
	χ_{35}	χ_{50}	χ_{65}	
chi	3.47	3.81	4.21	
mm/s	*90.17*	*71.06*	*53.87*	

Grain size analysis

SEDCAM site 6 - Yarra River



Statistical summary of results

	Mean	Sorting	Skewness	Kurtosis
phi	1.18	0.85	2.86	16.51
mm	*0.44*	*0.56*	*0.14*	*0.00*
	ϕ_{35}	ϕ_{50}	ϕ_{65}	
phi	0.73	1.04	1.38	
mm	*0.60*	*0.49*	*0.38*	

Textural description

Gravel	Sand	Silt	Clay
0.00%	98.84%	1.02%	0.14%

Moderately sorted, very positively skewed and extremely leptokurtic

Victorian Institute of Marine Sciences