MARINE MANAGEMENT SUPPORT:
MID WEST

BASELINE WATER QUALITY SURVEY OF THE CAPE PERON-MONKEY MIA REGION OF THE SHARK BAY WORLD HERITAGE AREA: AUTUMN 1998

Data Report: MMS/MW/SBMP - 12/1998

A collaborative project between the CALM Marine Conservation Branch, CALM Gascoyne District (Midwest Region) and Murdoch University

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

This report presents details of a baseline water quality survey undertaken during 4 March to 6 May 1998, in the eastern gulf of Shark Bay within the coastal zone off the Peron Peninsula between Cape Peron and Monkey Mia. Measurements at nine sites comprised total nitrogen, total inorganic nitrogen, total phosphorus, total inorganic phosphorus, chlorophyll-a, total suspended solids, salinity, temperature and light attenuation.

This survey aimed to provide a comprehensive quantitative baseline data set of the physical, chemical and biological characteristics of this region and to also establish and initialise long-term water quality monitoring sites. This information will provide a relevant ecological context from which to assess the impacts of any future changes in the water quality of the area that may be attributed to increases in human activity, such as aquaculture and tourism. Past water quality data (Trayler & Shepherd, 1993; Kendrick, *Pers. Comm.*) indicated that seasonal inorganic nutrient levels are most probably at their highest during the autumn period and also that re-suspension of sediments during strong bottom shear may lead to elevated nutrient concentrations in the water column. This information has was to help structure the temporal and spatial characteristics of the field program.

The autumn period was chosen for the survey on the basis of historical water quality data which suggested that key water quality parameters were likely to exhibit their greatest seasonal variation at this time of the year. The survey was structured to include a bi-daily (i.e., every second day) data set over the first two weeks (to encompass a complete neap/spring tidal cycle) and thence once per week for the following seven weeks. The historical data sets indicated that spring tidal flows could be correlated with relatively high nutrient levels in the water column and the intensive bi-daily monitoring was been designed to investigate this hypothesis.

The study was conducted as a collaboration between the Department of Conservation and Land Management's Marine Conservation Branch and Gascoyne District office and the Marine and Freshwater Research Laboratory (MAFRL) at Murdoch University.

1 INTRODUCTION

1.1 Background

Shark Bay (Figure 1) was included on the World Heritage List in 1991, in recognition of the international significance of the ecological and cultural values of the area. The Shark Bay Marine Reserves Management Plan 1996-2006 was completed in 1996 (CALM, 1996).

The coastal region off the Cape Peron Peninsula, including the Monkey Mia lagoon, is an important visitor destination in this World Heritage Area and in recent years has experienced rapid growth in tourism and associated coastal infrastructure. In addition, there is now increasing interest from the aquaculture industry to site sea-farms in the area. However, the coastal environment is poorly understood in terms of background water quality. These waters therefore have a high conservation value and are likely to come under increasing pressure in the future from both tourism and commercially-based activity (e.g., recreational and commercial fishing, aquaculture, boating and ecotours). This juxtaposition of ecological values and potential threats means that it is timely to instigate baseline monitoring to define background water quality ahead of likely intensifications in potentially threatening activities in order to ensure that development proceeds in an ecologically sustainable manner.

The importance of having sound technical information for the management of human activities, that have the potential to threaten the environmental values of these waters, is emphasized in the recommendations of the Shark Bay Marine Reserves Management Plan 1996-2006 (CALM, 1996) and related environmental reports (Environmental Protection Authority, 1989; Trayler & Shepherd, 1993; Wilson, 1994). In a recent report (titled *Review of Environmental Impacts of Water Based Tourism at Monkey Mia*) Wilson (1996) concluded that there is significant potential for eutrophication in these nearshore waters, particularly within relatively poorly flushed areas such as the Monkey Mia lagoon. The current management plan (CALM, 1996) and Wilson (1996) recommend a quantitative baseline water quality survey of the Monkey Mia lagoon and adjacent waters off the cape.

This survey has partly addressed these recommendations by providing the first spatially and temporally comprehensive data set of water quality in the coastal region between Cape Peron and Monkey during typical autumn conditions and neap/spring tidal cycles.

The data provide a comprehensive quantitative baseline description of the physical, chemical and biological characteristics of this region and establish and initialize long-term water quality monitoring sites. The information is required to provide a relevant ecological context from which to help assess the impacts of any future changes in the water quality of the area that may be attributed to increases in human activity, such as aquaculture and tourism. Past water quality data (Trayler & Shepherd, 1993; Kendrick, *Pers. Comm.*) indicated that seasonal inorganic nutrient levels are most probably at their highest during autumn and also that re-suspension of sediments during strong bottom shear may lead to elevated nutrient concentrations in the water column. This information has been used to set the temporal and spatial characteristics of the field program.

The measurements conducted between the period 4 March to 6 May 1998, were structured to include a bi-daily (i.e., every second day) data set over the first two weeks (to encompass a complete neap/spring tidal cycle) and thence once per week for the following seven weeks to provide data over a typical autumn period. The historical data sets have indicated that spring tidal flows may be correlated to relatively high nutrient levels in the water column and the intensive bi-daily monitoring was designed to investigate this hypothesis. The monitoring program was also designed to opportunistically capture occasional strong wind events, particularly during the initial two-week intensive phase, thereby providing an opportunity to measure any possible changes in water column nutrient levels that may be induced by re-suspension due to wind-generated turbulence.

The nine sites chosen (Table 1 and Figure 2) were selected to provide a logistically manageable, broad spatial coverage in terms of returning water quality data that will represent a naturally occurring range in the respective parameters monitored.

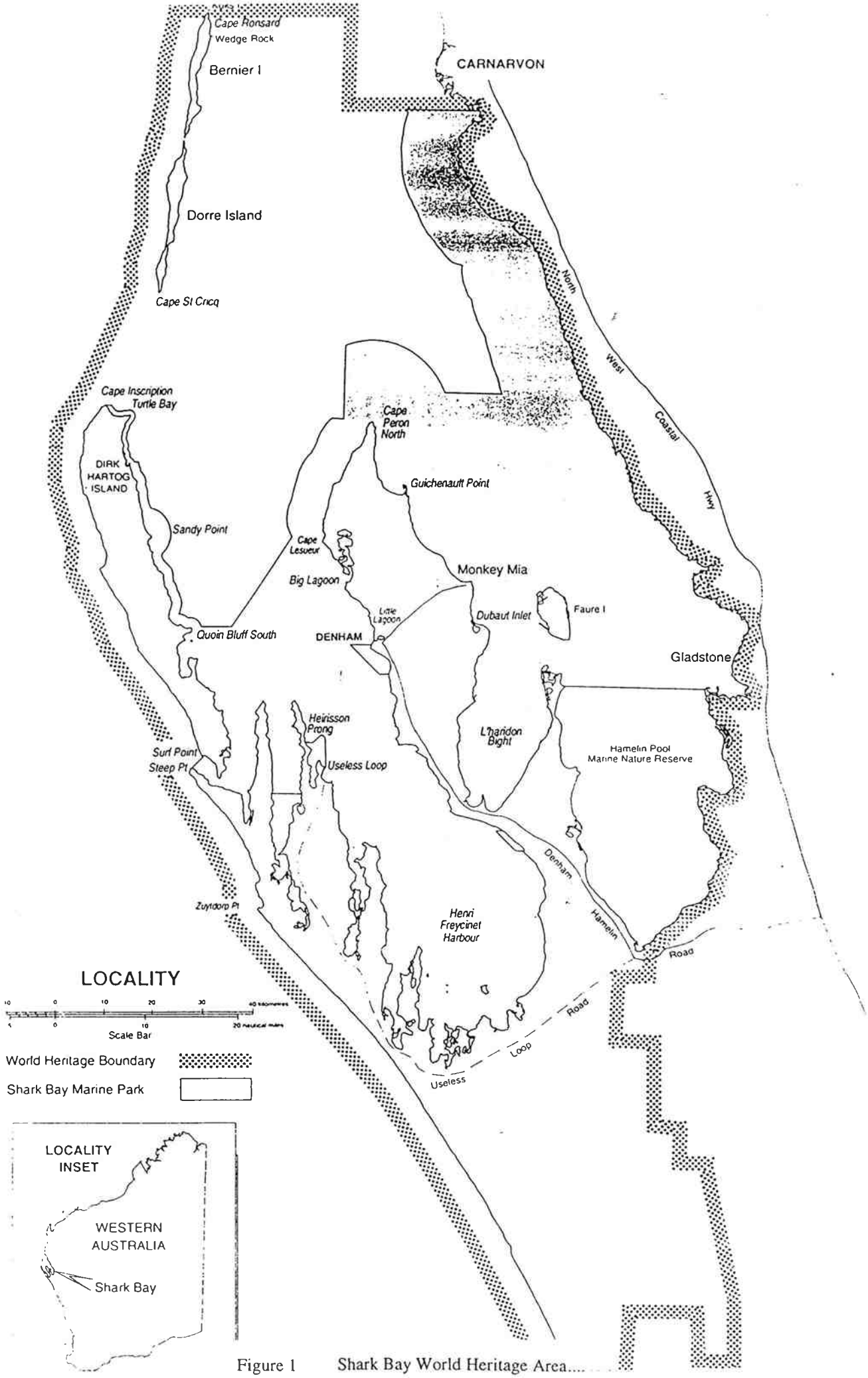

Figure 1 Shark Bay World Heritage Area....

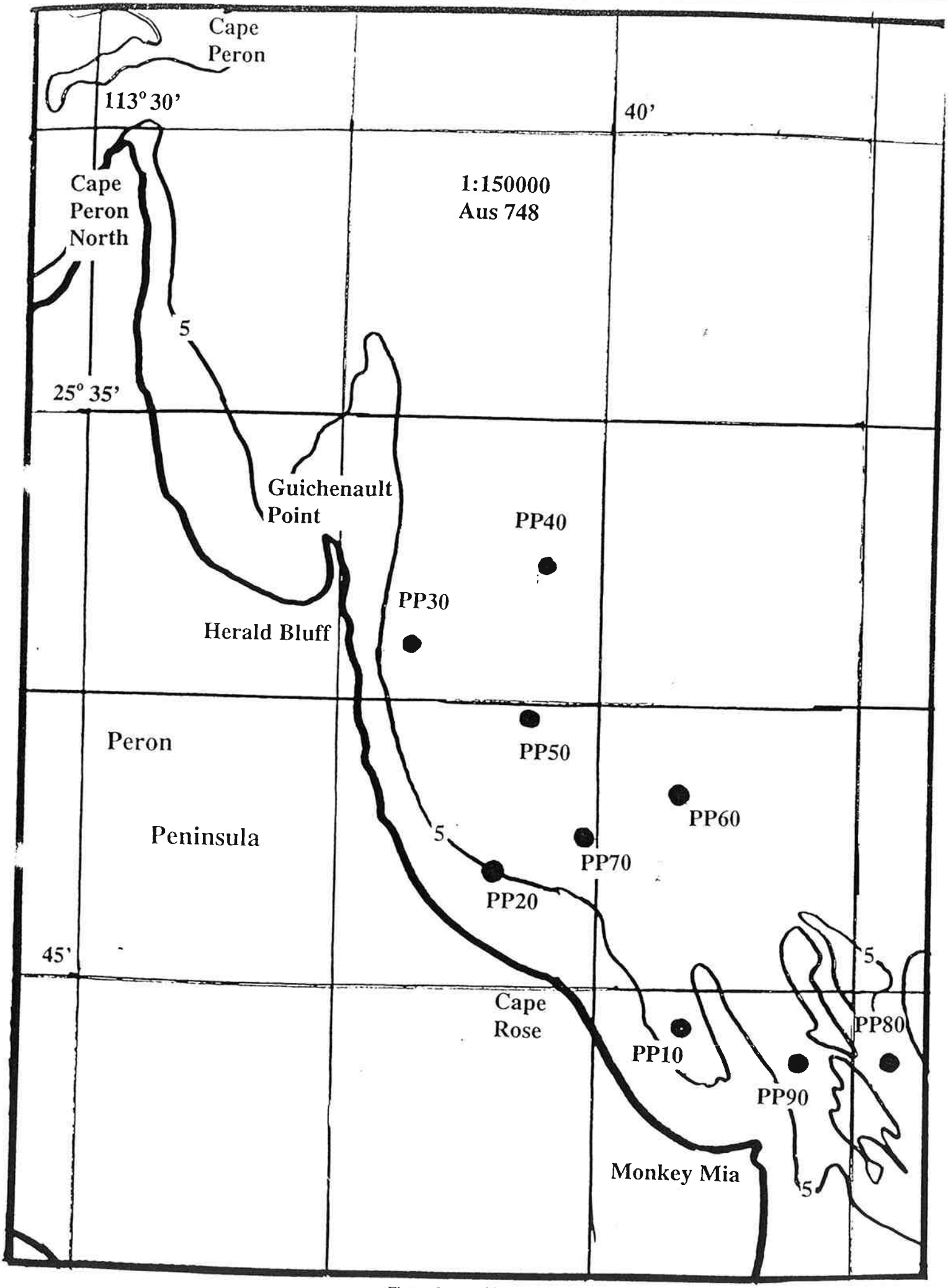

Figure 2 Site locations

1.2 Aims

- To provide a comprehensive quantitative baseline description of the physical, chemical and biological characteristics of the nearshore waters off the Peron Peninsula between Monkey Mia and Cape Peron.

- To establish and initialize long-term water quality monitoring sites in the nearshore waters off the Peron Peninsula between Monkey Mia and Cape Peron.

2 METHODS

2.1 Site selection

The nine sites for the survey were located within the coastal waters off the Peron Peninsula between Cape Peron and Monkey Mia (Figure 2). Access to the sites was from the launching area at Monkey Mia.

The site coordinates are listed in Table 1. A portable hand held GPS was used to record site locations in the field.

Table 1 Site coordinates

Site	coordinates		Comments
PP10*	113° 41.631'	25° 45.590'	Weekly
PP20*	113° 37.953'	25° 43.095'	Weekly; intensive (5-17 Mar)
PP30	113° 36.478'	25° 39.041'	Weekly
PP40	113° 38.890'	25° 37.577'	Weekly
PP50*	113° 38.594'	25° 40.358'	Weekly
PP60*	113° 41.701'	25° 41.661'	Weekly; intensive (5-17 Mar); continuous light and temperature loggers
PP70	113° 39.679'	25° 42.434'	Weekly
PP80	113° 45.709'	25° 46.154'	Weekly
PP90*	113° 43.981'	25° 46.278'	Weekly; intensive (5-17 Mar); continuous light and temperature loggers

* The MCB DGPS was used to accurately record these site locations in the field.
Note: Site buoy for PP90 was shifted in the process of collection and downloading of loggers on the 27/3/98 so that the GPS coordinates changed to 113° 44.065', 25° 46.532'. This was readjusted to the original coordinates in the above Table on the 31/3/98.

The eastern gulf has a number of physical characteristics that were considered in selecting the site locations. First, there is a characteristic strong north-south salinity gradient (Logan & Brown, 1986; Smith & Atkinson, 1983) with salinity ranging typically from about 38 pss at Cape Peron to about 45 pss in the vicinity of Faure Island. Hence, it was deemed pertinent to have a spread of sites in the north-south direction. Second, the prevailing wind climate in summer/autumn is strongly influenced by sea-breeze fields that blow from the southwest during which the eastern coastline of the Peron Peninsula is sheltered. Third, the shoreline shape is characterized by a series of semi-protected crenulate-shaped coastal embayments due to the presence of northward aligned sills that emanate from the main coastline, such as at Monkey Mia and Guichenault Point. Furthermore there is increasing interest for aquaculture development to be sited in the region.

The chosen grid characterized the centre-most of the three repeating nearshore crenulate-shaped bays between Cape Peron and Monkey Mia and the sites were spaced to provide a broad coverage of the bay and to capture any of the north-south and east-west gradients in environmental conditions discussed above.

Logistically, the chosen field grid had to fall within the boating safety requirement that the vessel operate within 5 nm of shore. The route was traversable within about 4 hours of boating time in calm to moderate conditions provided water samples were bottled in the field to be filtered later on land. Each site required approximately 20 minutes of monitoring and sampling, resulting in the field day having an approximate duration of 7 hours from launch to retrieval of the vessel at Monkey Mia.

Not withstanding climatic and oceanographic constraints, an attempt was made to monitor all nine sites routinely, once per week throughout a ten week period, yielding a total of ten sampling days. Additionally, a subset of three sites were monitored approximately every second day of the first two weeks. The sampling routines are described below.

2.2 Data collection

2.2.1 Weekly measurements

The ten weekly surveys comprised of monitoring for nutrient and chlorophyll-a concentrations, total suspended solids (TSS), salinity, temperature and light attenuation, at the sites detailed in Table 2, and according to the following methods.

Nutrient, chlorophyll- a and total suspended solids

During the first week of sampling it became apparent that filtering in the field was problematic due to the difficulties imposed by the vessel's motion on sampling procedures, and the time required to achieve this task meant long hours spent in a boat with little protection from the elements. A decision was made to utilise 5L containers to collect water samples in the field, which were placed in light-proof eskys and surrounded by ice to decrease microbial activity. These samples were then taken back to the chalet were they were filtered and immediately stored in a freezer awaiting transportation to Perth.

Integrated sampling (sites PP10, 30, 40, 50, 70, 80)

Water samples for total nitrogen (TN), total inorganic nitrogen (TIN), total phosphorus (TP) and total inorganic phosphorus (TIP), plus 2 spares (one for totals and one for inorganics) were taken from depth-integrated water samples. These samples were comprised of a mixture of equal parts of surface and bottom water from sites PP10, 30, 40, 50, 70, 80.

At each site, a five-litre surface volume (collected with a bucket) and five-litre bottom volume (collected with a Niskin bottle) were mixed in a clean bucket. From this unfiltered integrated water sample, three 150 ml sub-samples (for TP, TN and an unfiltered spare, respectively) were placed in labelled polyethylene bags (Nasco "Whirlpak", Kansas, USA). At least two litres of the integrated water was filtered, using the filter tower, through a 1.2 μm G/FC Whatman filter paper at a maximum negative pressure of 75 kPa. The filter paper was wrapped in aluminium foil, placed in a labeled envelope and retained for chlorophyll-a analyses. The volume of water filtered was noted and written on the envelope. If deemed necessary at the site, a greater volume of water was filtered through the filter paper in order to provide a sufficiently dense chlorophyll-a mass on the filter paper. The filtered water was then further filtered through a 0.45 μm micropore filter and individual 150 ml sub-samples for TIN/ TIP and a spare for 'inorganics' were placed into labelled Whirlpaks.

The remaining unfiltered water was filtered through a pre-weighed 1.2 μm G/FC Whatman filter for TSS analyses. Then approximately 250 ml of de-ionized water was rinsed through the filter to remove excess salts. The filter paper was then removed, wrapped in foil and placed in a labelled envelope. All samples were placed on ice in an esky and taken to a freezer once filtering was complete.

Surface and bottom sampling (sites PP20, 60, 90)

In addition to the integrated measurements, surface and bottom sampling were conducted at the remaining three sites (i.e., PP20, 60 and 90). At these three sites nutrient, chlorophyll-a and TSS samples data were collected from both the surface and bottom water volumes, rather than from just a depth-integrated water column sample. The complementary vertical salinity-temperature profiling at all sites were collected to facilitate interpretations in the event that there were marked differences in the concentrations of water quality parameters between the surface and bottom due to say vertical stratification of the water column by local or advective influences.

Transport of samples from Denham to Murdoch University

Each week's set of frozen samples were placed in polystyrene packs which were transported to Perth Airport by Western Airlines. The flight departed Denham every Monday, Wednesday and Friday at 1400 hrs and arrived at Perth Airport at 1700 hrs. Arrangements were made by Mike Lapwood of the Marine Conservation Branch for Western Airlines to place the samples in a freezer (supplied by the MCB) situated in the premises of Western Airlines at Perth Airport. Courier Australia collected and delivered the samples to the Marine and Freshwater Research Laboratory (MAFRL), School of Environmental Science, Murdoch University on the following day.

Analyses were conducted at MAFRL with results periodically faxed back to the field officer for ongoing data processing and data report production during the ten week survey.

Salinity and temperature

Salinity (S) and temperature (T) profiles were acquired by manually profiling the water column with a Yeokal Hamon Model 602 Salinity-Temperature Bridge (accuracy ± 0.03pss). Data were recorded on field sheets and backed up by writing each profile data set to an EXCEL data file. Calibrations were carried out as follows: two times per day a bucket of water was collected from the surface and (i) a sample of the water placed in a clean sealed salinity bottle, (ii) the salinity and temperature of the water in the bucket recorded with the ST meter, and (iii) quickly (within 60 seconds) thereafter its temperature recorded with a scientific thermometer (accuracy ± 0.05 °C) . The calibration information (bottle number, ST meter readings and thermometer readings) were recorded on calibration sheets. The bottled salinity samples were sent to the Chemistry Centre (WA) to be analyzed for true salinity (within ±0.1 ppt). Ongoing data processing of the ST data was conducted throughout the survey.

Light attenuation

Photosynthetically Active Radiation (PAR) profiles, from which attenuation coefficients were determined, were attained by manually profiling the water column with a 2π Li-Cor Sensor used from an LI-188b meter. Data were written to field data sheets and backed up by writing each profile data set to an EXCEL data file. Ongoing data processing of the light data was conducted throughout the survey. The light meter was calibrated prior to the survey at the MAFRL.

2.2.2 Intensive measurements

In addition to the weekly measurements, three sites (PP20, 60 and 90) were visited approximately every second day for the first two weeks of the field survey. The sampling routine and analyses were similar to those for the weekly surveys, with the exception being that samples were collected from both the surface and bottom of the water column. This resulted in nutrient, chlorophyll-a and TSS samples taken from just both the surface and bottom water volumes, rather than from a depth-integrated water column sample.

2.2.3 Light and temperature logging

Light logging

Three WESDATA light loggers were deployed for the duration of the survey. The deployment comprised of two sites PP60 and PP90. At site PP60 (approximately 12m at mean sea level) one logger (20357) was positioned 1.5m from the bottom and a second logger (20595) was positioned 12m from the bottom. Site PP90 (approximately 10m at mean sea level) had only one logger (20356) positioned 1.5m from the bottom. The loggers were calibrated prior to the survey by the MAFRL, Murdoch University. The arrays were designed and prepared prior to the survey by the MCB, requiring only minor alterations once placed in the field .

Temperature logging

Six DATAFLOW temperature loggers were deployed as vertical arrays at the two light logger sites PP60 and PP90 (3 loggers per site; near-surface, near-middle and near-bottom at each site) to provide continuous measurements of water column temperature. Site PP60 had temperature loggers at 1m (20359), 7m (20355) and 12m (41599) above the bottom with site PP90 having loggers at 1m (39002), 4m (41597) and 7m (39003) above the bottom. These data are used to indicate the formation and destruction of vertical temperature stratification in response to daytime heat fluxes, wind mixing, tidal stirring and penetrative convection. The temperature loggers were calibrated prior to the survey by the MCB. The arrays were designed and prepared prior to the survey by the MCB, requiring only minor alterations once placed in the field.

2.3 Analyses and data retrieval

Nutrients and chlorophyll-a

Orthophosphate was analyzed by the single solution method (Major *et al.*, 1972); nitrate-nitrite after copper-cadmium reduction with a Technicon Auto-analyser; and ammonia by the phenol-prusside method (Dal Pont *et al.*, 1974). Total nitrogen and total phosphorus were determined from sulphuric and perchloric digests, respectively, followed by analyses for ammonia and phosphate, as described above. Chlorophyll-a was analysed after 24 hours in 90 % acetone at light wave lengths of 750 nm, 664 nm and 630 nm according to the methods of Jeffrey and Humphrey (1975).

The samples were transported in a frozen state (*see* Section 2.2.1) to the Marine and Freshwater Research Laboratory (MAFRL), School of Environmental Science, Murdoch University. Analyses were conducted at MAFRL and the results faxed back to the field officer for data processing and data report production.

Total Suspended Solids

Suspended solids are the portion of material retained by a filter paper when a solution is passed through it. A well-mixed sample is filtered through a pre-weighed standard glass fibre filter paper (Whatman GF/C 25mm diameter). In the laboratory the retained residue and filter are dried to a constant weight at 105°C.

$$\text{Total Suspended Solids (mg/L)} = \frac{10^6 \times (A - B)}{V}$$

where A = weight of crucible + residue (g).
B = weight of crucible (g).
V = volume of sample (mL)

The samples were transported in a frozen state (*see* Section 2.2.1) to the Marine and Freshwater Research Laboratory (MAFRL), School of Environmental Science, Murdoch University. Analyses was conducted at the MAFRL and the results faxed back to the field officer for data processing and data report production.

Salinity and temperature profiles

Each ST profile data set was written to EXCEL file.

For each site's data set, vertical plots of salinity versus depth and temperature versus depth were constructed using the EXCEL plotting options.

Salinity calibration

The bottled salinity samples were analyzed for true salinity (within ±0.1 ppt) at the Chemistry Centre (WA. The Chemistry Centre used the gravimetric method to determine the results for the salinity calibrations in Table 2. This method has an accuracy of ±0.1ppt and is carried out by (i) weighing the sample, (ii) evaporating off water, (iii) leaving behind solids (salt), (iv) weighing the salt, and (v) determining concentration of salt per unit volume. The results suggest the raw data need to be adjusted by adding between 2.2 and 6.0 ppt to the raw values. This is considered to be too large a range, reducing our confidence in the data quality. Hence, only raw salinity data are presented and the profiles can only be used to indicate vertical salinity structure. Salinity comparisons between sites or between days are not possible.

Table 2 Salinity calibration data

Site	Time	Date	Bottle Number	Recorded salinity of raw field sample (pss)*	Salinity of sample from laboratory analysis (pss)**	Adjustment required to raw data (pss)
PP20	1445	05-03-98	008	39.7	42.9	Add 3.2
PP90	1020	05-03-98	071	41	43.2	Add 2.2
PP10	1605	07-03-98	150	39.9	44	Add 4.1
PP90	0745	07-03-98	176	39.85	43.9	Add 4.05
PP20	1110	09-03-98	049	40.5	44.6	Add 4.1
PP90	1330	09-03-98	162	40.35	44.0	Add 3.65
PP10	1235	10-03-98	141	42.25 (off scale)	45.3	-
PP90	0850	10-03-98	023	40.5	45.6	Add 5.1
PP20	1045	13-03-98	118	41.6	46.6	Add 5.0
PP90	0820	13-03-98	182	44 (off scale)	47.0	-
PP20	1240	14-03-98	102	40.25	45.7	Add 5.45
PP90	0905	14-03-98	187	41.7	44.9	Add 4.2
PP10	1455	16-03-98	143	40.3	45.1	Add 4.8
PP90	0940	16-03-98	129	41.6	N/A	N/A
PP10	1630	25-03-98	019	39.6	44	Add 4.4
PP90	0915	25-03-98	042	41.15	45.2	Add 4.05
PP10	1515	31-03-98	154	38.3	42.6	Add 4.3
PP10	1500	08-04-98	016	39.9	N/A	N/A
PP10	1420	15-04-98	031	40.4	45.2	Add 4.8
PP10	1530	21-04-98	020	40.75	44.6	Add 3.85
PP10	1415	28-04-98	188	40.7	44.8	Add 4.1
PP10	1345	05-05-98	007	40.9	45.3	Add 4.4
PP90	0900	05-05-98	113	40.5	46.5	Add 6.0

Comments on salinity calibration data (above):
* ST meter is a Yeokal Hamon Model 602 Salinity-Temperature Bridge.
** Chemistry Centre (WA) using gravimetric method.

Table 3 Temperature calibration data

Site	Time	Date	Bottle Number	Recorded temperature of raw field sample (°C)*	Temperature of sample from thermometer reading (°C)**	Adjustment required to raw data (°C)
PP20	1445	05-03-98	008	28.9	29.0	Add 0.1
PP90	1020	05-03-98	071	26.1	26.2	Add 0.1
PP10	1605	07-03-98	150	28.5	28.7	Add 0.2
PP90	0745	07-03-98	176	26.5	26.7	Add 0.2
PP20	1110	09-03-98	049	28.4	28.4	-
PP90	1330	09-03-98	162	27.6	27.9	Add 0.3***
PP10	1235	10-03-98	141	21.1	20.9	Subtract 0.2***
PP90	0850	10-03-98	023	25.7	25.8	Add 0.1
PP20	1045	13-03-98	118	24.6	24.7	Add 0.1
PP90	0820	13-03-98	182	21	21.2	Add 0.2
PP20	1240	14-03-98	102	26.1	26.2	Add 0.1
PP90	0905	14-03-98	187	24	24.2	Add 0.2
PP10	1455	16-03-98	143	26.5	26.6	Add 0.1
PP90	0940	16-03-98	129	25.4	25.4	-
PP10	1630	25-03-98	019	27.8	27.9	Add 0.1
PP90	0915	25-03-98	042	24.6	24.6	-
PP10	1515	31-03-98	154	27.2	27.3	Add 0.1
PP10	1500	08-04-98	016	25.7	25.7	-
PP10	1420	15-04-98	031	25.2	25.3	Add 0.1
PP10	1530	21-04-98	020	24.1	24.2	Add 0.1
PP10	1415	28-04-98	188	23.9	23.9	-
PP10	1345	05-05-98	007	24	24	-
PP90	0900	05-05-98	113	23.6	23.7	Add 0.1

Comments on temperature calibration data (above):
* ST meter is a Yeokal Hamon Model 602 Salinity-Temperature Bridge.
** Scientific thermometer reference TOT 1mm E-MIL Goldline.
*** Rejected data because it was significantly higher than other calibrations.

Temperature calibration

The temperature calibrations were conducted in the field by the field officer using a scientific thermometer. The results are provided in Table 3 and suggest the raw data need to be adjusted by adding between 0.1 °C and 0.2 °C. The results for PP90 on the 9/3/98 and PP10 on the 10/3/98 are considered to be erroneous and therefore omitted from further calculations. A mean temperature adjustment of 0.1 °C has been adopted. All raw temperature data therefore had 0.1 °C added to them.

Temperature and light logger time series

The data from the six temperature and three light loggers were retrieved and downloaded on the 9/3/98, 25/3/98 and the 6/5/98. Downloading the data during the survey enabled a check to be made on the performance of the loggers and allowed any required maintenance to be performed. Data were calibrated using pre-determined calibration files and written to an EXCEL data file. Time series plots have been constructed. Data processing was conducted during and after the field survey.

Light attenuation

Light profiles were plotted as 'Light attenuation $\log_{10}m^{-1}$ versus Depth (m)'. Data processing was conducted during and after the field survey.

2.4 Field log

The field log for the survey is presented in Table 4 and provides an overview of all activities conducted between 4 March to 6 May 1998.

2.5 Results

Nutrients

The list below shows the average nitrogen to phosphorus ratio for each site including top and bottom water samples for PP20, PP60, and PP90. Total nitrogen and phosphorus (the sum of inorganic and organic components from Appendix 1) was calculated for each site. Mean concentrations for each nutrient was derived for all sampling occasions at each site. The ratios indicated that the system in the Eastern Gulf was slightly limited in phosphorus. In addition, PP30 - one of the northern most points in the survey - has one of the lowest N:P ratios being 10:1 where as PP80 and PP90 (the southern most sites) have the highest N:P ratios of 16:1 and 18:1. The study by Atkinson, (1987) showed there was a correlation between salinity and phosphorous concentration, with higher salinities generally associated with lower phosphorus concentrations. It is well known that in this region of Shark Bay salinities increase from south to north (Logan & Brown, 1986; Smith & Atkinson, 1986).

Site	N:P ratio
PP10	14:1
PP20 (Top)	14:1
PP20 (Bottom)	14:1
PP30	10:1
PP40	13:1
PP50	13:1
PP60 (Top)	13:1
PP60 (Bottom)	15:1
PP70	11:1
PP80	16:1
PP90 (Top)	16:1
PP90 (Bottom)	18:1

The concentrations of TIN, TN, TIP, and TP did not show any distinct increase during spring tide events when compared with those of neap tide events. There also appeared to be no increase or decrease for these parameters at each of the sites over the two month period. Concentrations fluctuated between small ranges for each of the parameters.

The range of Chlorophyll *a* concentrations for the study sites was 0.4*u*g/L to 2.6*u*g/L which is within normal oceanic limits (Clayton & King, 1995). The majority of sites recorded concentrations below 2*u*g/L with the only site to record a concentration above this of 2.6*u*g/L being PP60 (Bottom). The 'Bottom' samples from PP20, PP60, and PP90 generally exhibit increased chlorophyll *a* concentrations compared with the 'Top' samples from the same sites. This may result from phytoplankton's photoinhibition when close to the surface as a result of high light intensities and UV radiation, making deeper water more accommodating for phytoplankton growth (Clayton & King, 1995). The concentrations of Chlorophyll *a* did not show any distinct increase during spring tide events when compared with those of neap tide events. There also appeared to be no apparent correlation between nitrogen and phosphorus concentrations and concentrations of chlorophyll *a* .

Salinity, temperature Profiles

In general, all sites displayed a halocline with salinity increasing with depth and a themocline with temperature decreasing with depth. Occasions where temperature increased with depth such as PP20 on the 5/5/98, PP40 on the 8/4/98 and PP50 on the 10/3/98 and 8/4/98 may result from the presence of colder low salinity water residing over warmer higher salinity water, with density dominated by the salinity structure (Figures 16, 18 &19). Although temperatures varied for each sampling event the temperature profiles for PP80 displayed consistent temperature throughout the vertical profile on all sampling occasions (Figure 22).

Vertical profiles which exhibited a vertically isohaline and isothermal structure were recorded at PP10, PP20, PP70, PP80, and PP90 on the 28/4/98 and at PP10, and PP20 on the 10/3/98 (Figures 15, 16, 21, 22 & 23). This may have resulted from the strong winds of up to 20kn, along with rough sea conditions being recorded on these days leading to the water column being well mixed. It is unlikely that these events resulted from increased mixing solely due to spring tides as the days mentioned share a mixture of both spring and neap tides.

The salinities recorded for site PP30 and PP40 in the vicinity of Cape Peron ranged from 37.65pss to 40.9pss (Figures 17 &18) whereas those for PP80 and PP90 in the vicinity of Faure Island, ranged from 39.9pss to >42pss (Figures 22 &23). On seven of the ten sampling occasions at PP80, the site closest to Faure Island and Hamelin Pool, the salinity concentrations were off the scale of the salinity meter (i.e. >42pss). All values greater than 42pss are therefore, at best, approximations. These results are consistent with the eastern gulf's known salinity characteristic of a strong north-south salinity gradient with salinity ranging typically from approximately 38pss at Cape Peron to approximately 45pss in the vicinity of Faure Island (Logan & Brown, 1986; Smith & Atkinson, 1983).

(The concentrations for salinity and figures for temperature mentioned above are uncalibrated values)

Light attenuation

In general, light attenuation throughout the water column for all sites shows a strong correlation with depth with values of R^2 ranging from 0.97 to 0.9963. Where values for R^2 are at the lower end of this range, for example, an R^2 of 0.9793 was returned for PP10 on the 8/4/98 (Figure 24), it is quite possible that cloud cover was high (50%) at the time of the recording and this may have corrupted the results by fluctuating the amount of incident light reaching the water. The lowest value of R^2 recorded was for PP90 on the 16/3/98 being 0.8349, this value is possibly erroneous and not considered in the overall range of R^2 .

2.6 Equipment list

The equipment list was used to confirm all field requirements and group all equipment ready for packing in the MCB Fremantle field station by Wednesday 25 February 1998.

CALM vessel

The CALM vessel was the MCB "EX63" 4.7m Westerberg aluminium runabout with 40hp Johnson outboard. The vessel was equipped with:

- 9hp auxiliary motor from Gascoyne District Office
- VHF marine radio
- CALM HF radio
- Safety equipment: life jackets, flares, fire extinguisher, oars & rowlocks, tool box, 2 anchors, anchor rope and first aid kit.
- Trailer with winch, spare wheel, wheel brace, spare bearings
- 2x 25 litre fuel tanks

Technical equipment

- MCB DPGS: Trimble Scoutmaster coupled with Omistar demodulator
- Li-Cor LI-188b with Li-Cor 2π light sensor
- Yeo-kal Salinity Temperature Bridge 602 MkII, serial no ST384
- Scientific thermometer
- Digital thermometer
- 6 Wesdata data loggers with thermisters
- 4 Wesdata data loggers with Li-Cor 2π light sensors
- Equipment instruction manuals
- Laptop computer (discs, communication cable)
- Silicon grease, 'O' rings, desiccant drysacks
- Esky for temperature logger calibrations

Stationary

- Salinity/temperature profile sheets
- Light profile sheets
- Field report sheets
- 6 x HB pencils
- 2 x erasers
- pencil sharpener
- 4 x black permanent markers
- 250 numbered waterproof labels
- 400 small envelopes for chlorophyll-a & TSS filters

- *Sundry equipment*
- 2x 5 l Niskin sampler (one as a spare)
- Rope, weights & 2x messanger for Niskin samplers
- Secchi disc and graduated drop line
- gantry, winch and depth indicator pulley wheel
- 3x 5 l filter tower with vacuum pump and 12 volt leads
- 4 x 9 volt batteries (spares)
- back-up spare 12 volt battery
- back-up spare 12 volt vacuum pump
- 2x20 l plastic buckets
- 2x5 l plastics buckets
- 2 l graduated beaker
- 10 l graduated beaker
- Acid (diluted HCl)

- 20 l de-ionized water
- 2 x 500 ml squeeze bottles for de-ionized water
- box of tools eg forceps, aluminium foil, etc.
- Esky & icepacks
- 66 x 250 ml salinity bottles
- 10 polystyrene boxes and plastic liners
- 30 large plastic bags.
- 1000 150 ml Whirlpaks
- 200 1.2 μm Whatman GF/C filters
- 200 preweighed 1.2 μm Whatman GF/C filters
- 200 0.45 μm Micropore filters

Loggers, mooring arrays

- 5x 10kg ballast for light loggers
- 10 x 5kg ballast for marker floats
- assorted shackles
- 100m x 7mm polypropylene rope
- 4 float apparatus for light loggers
- clips, ties for temperature loggers
- 10 x 8" polystyrene floats, painted orange with "CALM. please leave" on them

3 BUDGET

Budget Item		WHA funds	CALM (in kind)	total cost
Contingency				
(administration, overuns)				
10% of funding		2500		2500
		2500		**2500**
Travel				
Airfares	2 x Denham –Perth @ $241	482		482
MCB Landcruiser	3000km @ 15c/km	450		450
Return of vessel to Perth post field survey (nominal)		900		900
		1832		**1832**
Accommodation and provisions				
Accommodation	1st-16th Mar 2 wk @ $200	400		400
Accommodation	16th Mar – 15th May 8 wk @ 120	960		960
Provisions	Allow $200/wk for 10 wk	2000		2000
		3360		**3360**
Staff				
N. D'Adamo	15 days (in kind)		8800	8800
Dr Eric Paling	10 days (in kind)			*
K. Bancroft	15 days (field/prep) @ $415/day	3100	3100	6200
T. Daly	5 days (prep) @ $340/day	850	850	1700
M. Lapwood	5 days (prep) @ $340/day	850	850	1700
Y. Pedretti	40 days (field/prep/reporting) (in kind)			*
Local CALM	20 days (field/prep/assistance) (in kind)		6800	6800
		4800	20400	**25200**
Vessels and other equipment				
CALM EX63	23 days @ $100/day	2300	*	2300
EX63 fuel	21 days @ $50/day	1050	*	1050
DGPS	3 day @ $95/day	285	*	285
Sal/Temp meter	21 days @ $40/day (in kind)	*	840	840
Light meter	21 days @ $40/day (in kind)	*	840	840
Light meter calibration	(Murdoch University) $50/hr (in kind)	*	*	0
Temp/light loggers	6 loggers for 10 wk @ $25/day	250	*	250
		3885	1680	**5565**
Chemistry costs				
Water quality (excluding TSS)	770 samples @ $10	7700	*	7700
Preweighed filters	200 @ $0.50	100	*	100
Trans to Perth	1st week 252 samples	175	*	175
	2nd week 288 samples	200	*	200
	3rd –10th week 54 samples ($64) x 7 wk	448	*	448
		8623	*	**8623**
	TOTAL EXPENDITURE	**$25000**	**$22080**	**$47080**

*** not assessed**

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Table 4 Log of field activities

Date	Time	Description of activities	Comments
3/3/98	0600	Drove to Shark Bay arriving at 1700	Crew (Nick D'Adamo, Kevin Bancroft and Yvette Pedretti) staying at the Shark Bay Caravan Park.
		The "exa" (boat used for sampling) was unloaded and equipment placed in and around the chalet.	
		Cabling on the "exa" taped together and CALM antenna tightened.	Wind from SW approx. 25kn clear sky with a few clouds. Moon is past first quarter.
4/3/98		Visit to Dehnam office to meet staff.	
		Set up account at BP Supermarket.	Sunny day light SE in am to sea breeze of approx. 15-20kn in pm . SW sea breeze at 1500.
	1330	Depart Monkey Mia.	
		Established sample sites with orange buoys for sites PP10, PP20, PP50, PP60 & PP90 .	DGPS coordinates recorded for PP10 (25^0 45. 590', 113^0 41. 631')
			DGPS coordinates recorded for PP20 (25^0 43. 095', 113^0 37. 953')
			DGPS coordinates recorded for PP50 (25^0 40. 358', 113^0 38. 594')
			DGPS coordinates recorded for PP60 (25^0 41. 661', 113^0 41. 701')
		Light and temperature logger arrays were deployed for sites PP90 and PP60.	
	1800	Arrive Monkey Mia	DGPS coordinates recorded for PP90 (25^0 46. 278', 113^0 43. 981')
		It was decided to re-configure the logger arrays to allow more line between marker.	Significant current and strong sea breeze at PP90.
			The "exa" was over loaded with three people and equipment resulting in the boat pushing water for most of the day.
			Faulty vacuum pump in tower.
5/3/98	0930	Depart Monkey Mia	
	0945	Sampling PP90 departure 1045.	Did not wash TSS (Total Suspended Solids) for both top and bottom samples with DI (deionized water).
	1130	Sampling PP60 departure 1230	Did not wash TSS (Total Suspended Solids) for both top and bottom samples with DI (deionized water).
		Sampling PP30 departure 1350	Filter tower damaged
	1410	Sampling PP20 departure 1500	
		Sampling PP60	Did not wash TSS (Total Suspended Solids) for both top and bottom samples with DI (deionized water).
	1600	Arrive Monkey Mia	
		Established sample sites with orange marker buoys for PP40, PP70, PP80	GPS coordinates recorded for PP40 (25^0 37. 577', 113^0 38. 890')
			GPS coordinates recorded for PP70 (25^0 42. 434', 113^0 39. 679')
		Drop off spare battery for boat at Shell Garage to be recharged.	GPS coordinates recorded for PP80 (25^0 46. 154', 113^0 45. 709')

Table 4 continued

Date	Time	Description of activities	Comments
6/3/98		Purchase Jockey wheel for "exa" and materials for the repair of the filter tower.	Jockey wheel stolen on the 5/3/98
		Borrowed three eski's from CALM Denham.	
		Set up Excel data sheet for temperature and salinity profiles.	
		Preparation of sample bags and equipment.	
7/3/98	0800	Sampling PP90 departure 0910	Calm, slight SE
	0915	Sampling PP80 departure 0955	
	1020	Sampling PP60 departure 1130	Collected water in bottles for filtering back at the chalet. Slight SE
	1150	Sampling PP40 departure 1225	Slight SE
	1240	Sampling PP50 departure 1300	
	1315	Sampling PP70 departure 1345	
	1400	Sampling PP20 departure 1430	
	1550	Sampling PP10 departure 1615	
		Trouble starting motor at 1130 causing the boat to drift	
8/3/98		Packed up the DGPS for transport to Perth.	
		Water bottles coming up from Perth, allowing the collection of samples in the field to be filtered back in the chalet.	
		Preparation of sample bags and equipment.	
9/3/98	1145	Sampling PP20 departure 1200	
	1215	Sampling PP60 departure 1315	picked up temperature and light loggers
	1330	Sampling PP90 departure 1405	picked up temperature and light loggers
		Down loaded loggers.	
		Arranged plug on the vacuum pump to operate from both cigarette lighter and battery clamps.	

Table 4 continued

Date	Time	Description of activities	Comments
10/3/98	0830	Depart Monkey Mia	
	0840	Sampling PP90 departure 0905	Deployed loggers
	0915	Sampling PP80 departure 0930	
	0955	Sampling PP60 departure 1020	Deployed loggers
	1045	Sampling PP50 departure	
	1115	Sampling PP70 departure 1135	
	1145	Sampling PP20 departure 1155	
	1230	Sampling PP10 departure.	
	1400	Arrive Monkey Mia.	
	1430	Filtering water samples completed at 1800.	
		Light meter not working, unable to fix.	
		Made up 4 x 12m lengths of 8mm rope to put on array.	
11/3/98		Arranged to get another light meter sent to Denham.	
		Tried to send samples to Perth but the airplane was full.	
13/3/98	0820	Sampling PP90 departure	**NOTE: data dated the 12/3/98 was actually recorded on the 13/3/98
		PP60 could not find, too rough	Very rough weather making it difficult to do any sampling.
		PP30 completed light and temperature profile, too rough.	
	1045	Sampling PP20 departure	
	1200	Data entry	
14/3/98	0830	Depart Monkey Mia	
	0905	Sampling PP90 departure 0930	Logger arrays tangled fixed at 0900.
	0950	Sampling PP60 departure 1020	Logger arrays extended.
	1045	Sampling PP40 departure 1100	
	1020	Sampling PP30 departure	
	1240	Sampling PP20 departure 1300	
	1400	Filtering water samples completed at 1730.	

Table 4 continued

Date	Time	Description of activities	Comments
16/3/98	0900	Depart Monkey Mia	
	0940	Sampling PP90 departure 1005	The Auxiliary motor nearly fell off during the sample run.
	1020	Sampling PP80 departure 1030	Grease on secchi cord.
	1100	Sampling PP60 departure 1115	Brad Barton unable to skipper the "exa".
	1150	Sampling PP40 departure 1210	Filter tower blown over and damaged in strong winds.
	1220	Sampling PP30 departure 1240	
	1325	Sampling PP50 departure 1335	
	1350	Sampling PP70 departure 1405	
	1420	Sampling PP20 departure 1435	
	1455	Sampling PP10 departure 1510	
	1530	Filtering water samples completed at 2100.	
25/3/98	0845	Depart Monkey Mia	
	0900	Sampling PP90 departure 0940	Picked up loggers at 0905
	0955	Sampling PP80 departure 1015	
	1100	Sampling PP60 departure 1120	Picked up loggers
	1145	Sampling PP50 departure 1205	
	1255	Sampling PP40 departure 1320	
	1350	Sampling PP30 departure 1410	
	1455	Sampling PP20 departure 1515	
	1540	Sampling PP70 departure 1550	
	1630	Sampling PP10 departure	
	1710	Arrive Monkey Mia	
		Downloaded loggers.	
		A shark severed the line connecting the buoys at PP60 which required reattaching.	
		The outboard broke down at PP50 making it necessary to complete the rest of the sampling utilising the auxiliary motor.	Sampling run from this point was extremely slow.
26/3/98	0930	Filtering water samples completed at 1400.	
	1420	Dropped samples off at airport.	
	1900	Data entry.	

Table 4 continued

Date	Time	Description of activities	Comments
27/3/98	1000	Depart Monkey Mia.	
	1030	Deployed loggers at PP90.	Location of loggers moved due to drift, GPS coordinates 25^0 46. 532', 113^0 44. 065' moved back to original coordinated on the 31/3/98.
	1115	Deployed loggers at PP60.	
	1215	Arrive Monkey Mia	
	1400	Dropped samples off at airport.	
28/3/98	1200	Purchased eski and cable ties.	
30/3/98	1200	Data entry.	
31/3/98	0915	Depart Monkey Mia	
	1000	Sampling PP90 departure 1025	Location of loggers changed back to those of the original GPS coordinates recorded for PP90 (25^0 46. 278', 113^0 43. 981')
	1040	Sampling PP80 departure 1050	**NOTE: samples dated 30/3/98 were actually sampled on the 31/3/98
	1120	Sampling PP60 departure 1145	
	1210	Sampling PP40 departure 1225	
	1235	Sampling PP30 departure 1300	
	1315	Sampling PP50 departure 1340	
	1400	Sampling PP70 departure 1430	
	1435	Sampling PP20 departure 1500	
	1500	Sampling PP10 departure 1520	
	1600	Arrive Monkey Mia.	
		Abnormal reading for the Salinity Meter are being recorded. Contacts cleaned.	
1/4/98	0900	Filtering water samples completed 1400	
2/4/98	1400	Data input.	

Table 4 continued

Date	Time	Description of activities	Comments
6/4/98	1100	Repair salinity meter.	
	1315	Delivered samples to airport.	
	1400	Data input.	
7/4/98	1000	Unable to program surface light logger for PP90. As a result, surface light logger measurements will be excluded from the survey.	
	2030	Sample bag and equipment preparation.	
8/4/98	0830	Depart Monkey Mia	
	0900	Sampling PP90 departure 0920	Rubber on the Nisken bottle perished and required replacing.
	0940	Sampling PP80 departure 1000	
	1035	Sampling PP60 departure 1100	
	1120	Sampling PP50 departure 1140	
	1205	Sampling PP40 departure 1225	
	1240	Sampling PP30 departure 1300	
	1330	Sampling PP20 departure	
	1410	Sampling PP70 departure	
	1505	Sampling PP10 departure 1530	
	1615	Arrive Monkey Mia.	
9/4/98	0900	Filtering water samples completed 1300.	
	1330	Data entry.	
10/4/98	0900	Graphing data.	
13/4/98	1200	Graphing data.	
14/4/98	2000	Sample bag and equipment preparation.	

Table 4 continued

Date	Time	Description of activities	Comments
15/4/98	0830	Depart Monkey Mia	Jack Dekker skipper.
	0850	Sampling PP90 departure 0915	The weight attached to the salinity meter disappeared during sampling.
	0930	Sampling PP80 departure 0945	Battery connections need replacing.
	1010	Sampling PP60 departure 1045	
	1100	Sampling PP50 departure 1120	
	1135	Sampling PP40 departure	
	1230	Sampling PP30 departure 1245	
	1300	Sampling PP70 departure 1325	
	1335	Sampling PP20 departure 1400	
	1420	Sampling PP10 departure 1445	
	1515	Arrive Monkey Mia.	
16/4/98	1400	Filtering water samples completed at 1900.	
19/4/98	1200	Graphing data.	
20/4/98	0630	Graphing data.	
	1000	Meeting Nick D'Adamo	
	1330	Delivered samples to airport.	
		Picked up battery terminal.	
21/4/98	0830	Depart Monkey Mia	
	0910	Sampling PP90 departure 0940	
	0950	Sampling PP80 departure 1020	
	1045	Sampling PP60 departure 1115	Retrieved loggers for PP60 at 1115 as one was visible from the surface. Loggers found to be in a tangle. Cleaned and re-deployed
	1150	Sampling PP50 departure 1210	
	1230	Sampling PP40 departure 1245	
	1300	Sampling PP30 departure 1325	
	1355	Sampling PP20 departure 1430	
	1445	Sampling PP70 departure	
	1530	Sampling PP10 departure 1555	
	1630	Arrive Monkey Mia	

Table 4 continued

Date	Time	Description of activities	Comments
22/4/98	0830	Preparation of sample bags.	
	1000	Filtered water samples completed 1630.	
	1330	Delivered samples to airport.	
23/4/98	1205	Retrieved loggers for PP90 at 1205 to check and clean. Loggers found to be in a tangle. Re-deployed at 1220.	
	1000	Data manipulation with Kevin Bancroft.	
27/4/98	1100	Graphing and data manipulation.	
28/4/98	0730	Picked up hire boat.	
	0900	Depart Monkey Mia	Very rough greater than 1m swell, strong current and 20kn winds.
	0930	Sampling PP90 departure 1000	Unable to pull up PP90 and PP60 to check loggers as weather was too rough.
	1020	Sampling PP80 departure 1040	
	1110	Sampling PP60 departure 1150	
		PP50 too rough	
		PP40 too rough	
	1205	Sampling PP70 departure 1215	
	1230	Sampling PP20 departure 1250	
	1315	Sampling PP30 departure 1335	
	1415	Sampling PP10 departure 1445	
	1530	Arrive Monkey Mia	
	2000	Preparation of sample bags.	
29/4/98	0900	Filtered water samples completed 1330.	
1/5/98	1400	Data manipulation.	
2/5/98	1500	Data manipulation.	
4/5/98		Organised freight for Thursday	

Table 4 continued

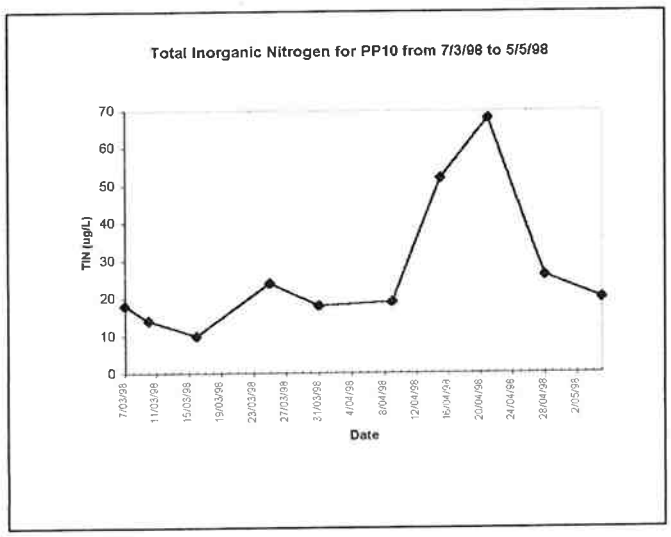
Date	Time	Description of activities	Comments
5/5/98	0845	Depart Monkey Mia.	Edwina Davis-Ward and Tim Page volunteers for the day assisting with sampling.
	0730	Pick up hire boat and load equipment.	
	0900	Sampling PP90 departure 0925	
	0935	Sampling PP80 departure 0945	
	1010	Sampling PP60 departure 1025	
	1040	Sampling PP50 departure 1105	
	1120	Sampling PP40 departure 1130	
	1145	Sampling PP30 departure 1150	
	1220	Sampling PP20 departure 1240	
	1305	Sampling PP70 departure 1315	
	1345	Sampling PP10 departure 1405	
	1445	Arrive Monkey Mia.	
6/5/98	0855	Depart Monkey Mia	
	0935	Collected loggers and buoys PP90	
	0950	Collected buoys PP80	
	1020	Collected loggers and buoys PP60	
	1050	Collected buoys PP50	
	1100	Collected buoys PP40	
	1115	Collected buoys PP30	
	1255	Collected buoys PP20	
	1340	Collected buoys PP70	
	1355	Collected buoys PP10	
	1430	Washed boat, removed equipment and returned it to the hire company.	
7/5/98	0900	Filtering samples.	
	1330	Packed up equipment and sent to Perth.	
8/5/98	1300	Dropped of two boxes of samples at the airport.	
11/5/98		Downloaded loggers.	

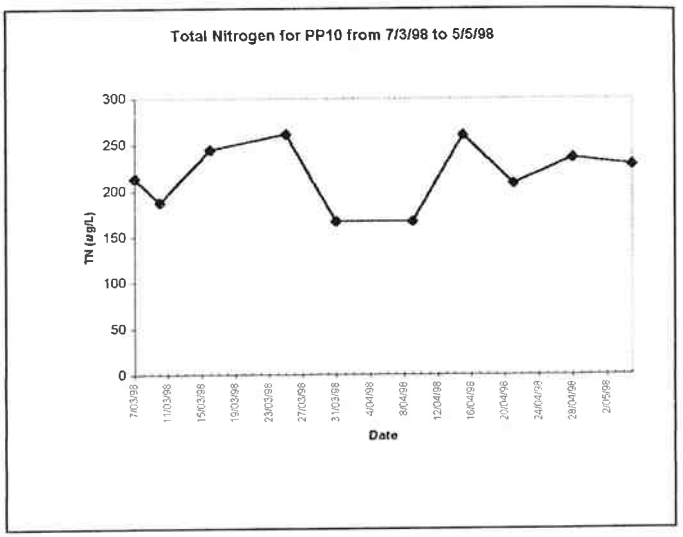
'Sampling' indicates that salinity/temperature profiles, light profiles and collection of water samples (surface samples collected with a bucket and bottom samples collected with a Niskin bottle) were conducted for that site.
'Filtering' indicates water samples were filtered back in the chalet for total nitrogen (TN), total inorganic nitrogen (TIN), total phosphorus (TP) and total inorganic phosphorus (TIP), total suspended solids (TSS) and Chloropyll *a*.
'GPS' Geographical Position System

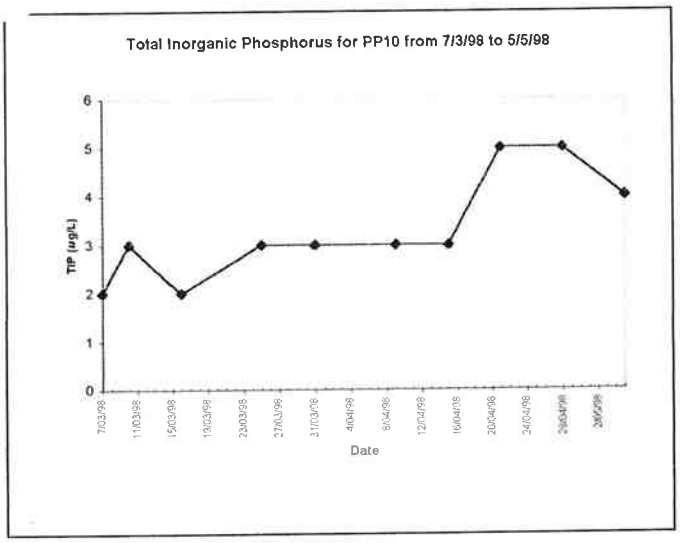
DATA PRESENTATION

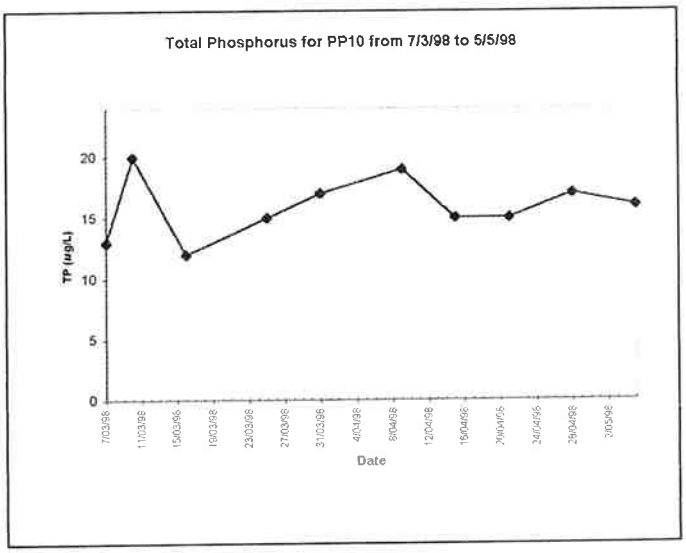
(electronic archives at Marine Conservation Branch, CALM)

Nutrients and chlorophyll-a









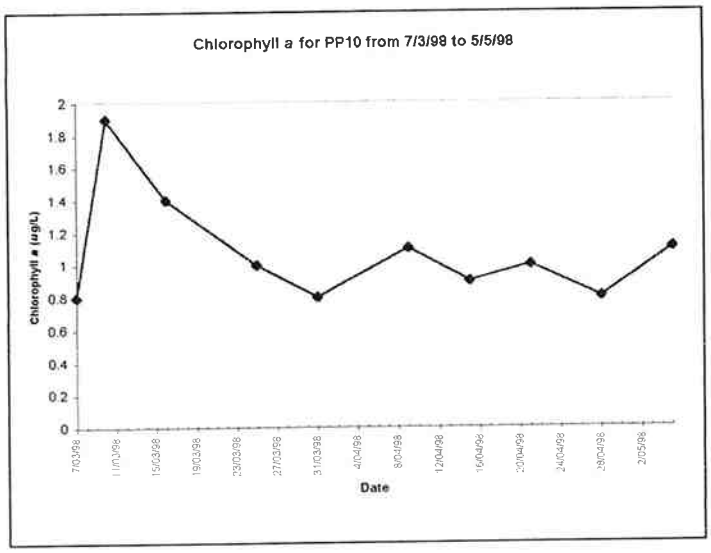
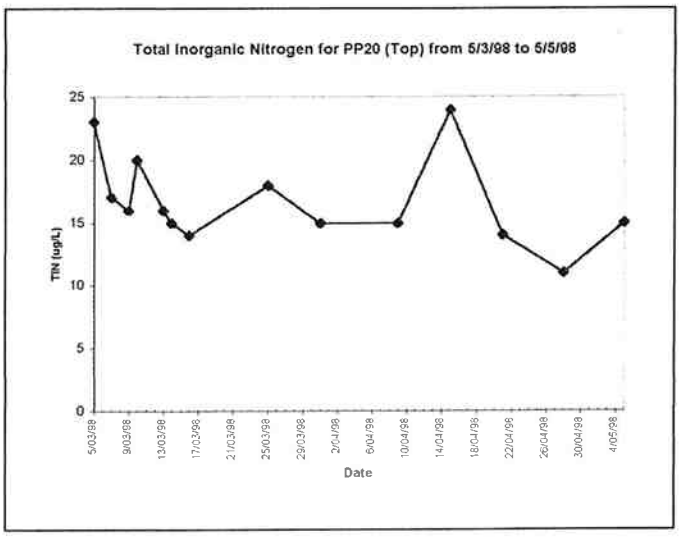
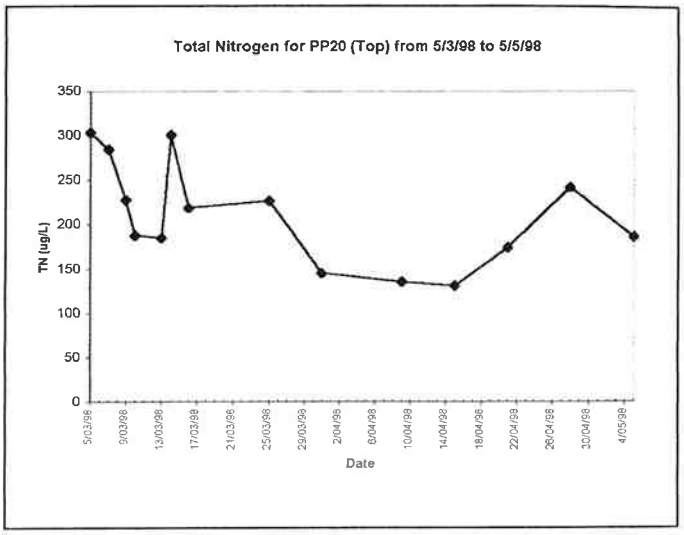
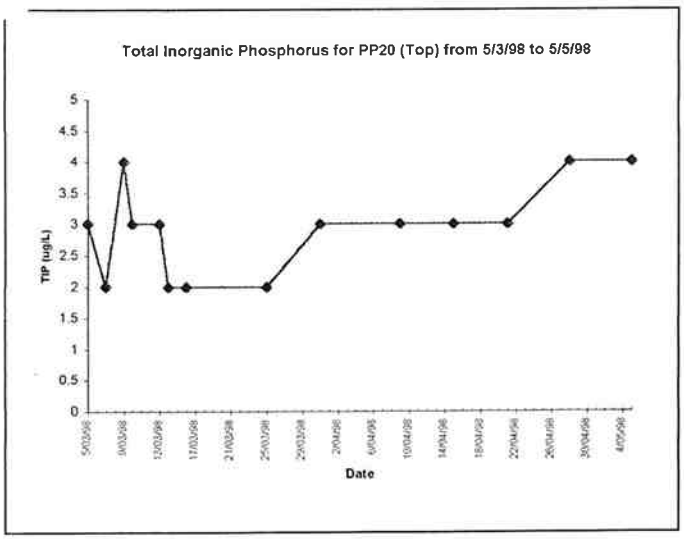
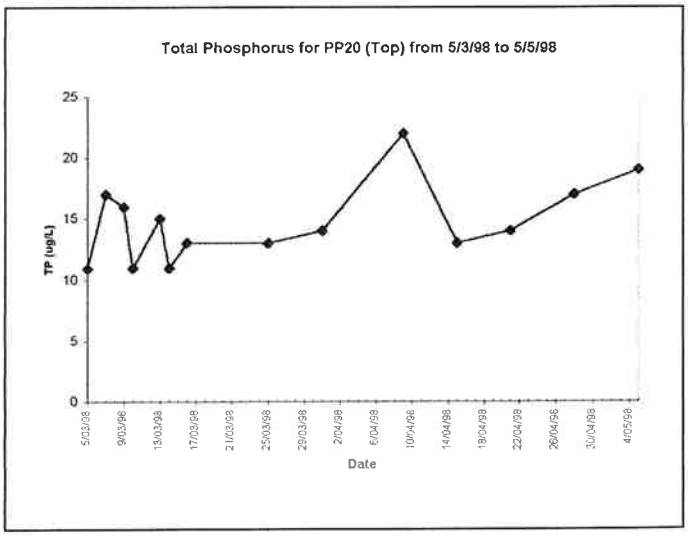


Figure 3 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP10 from the 7/3/98 to 5/5/98









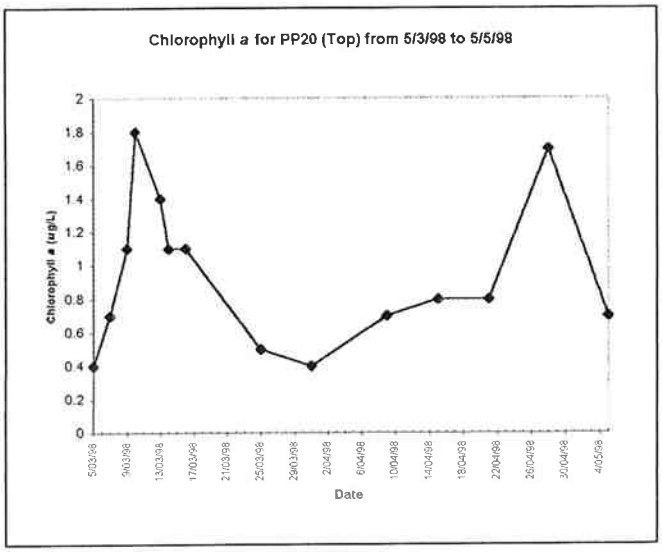
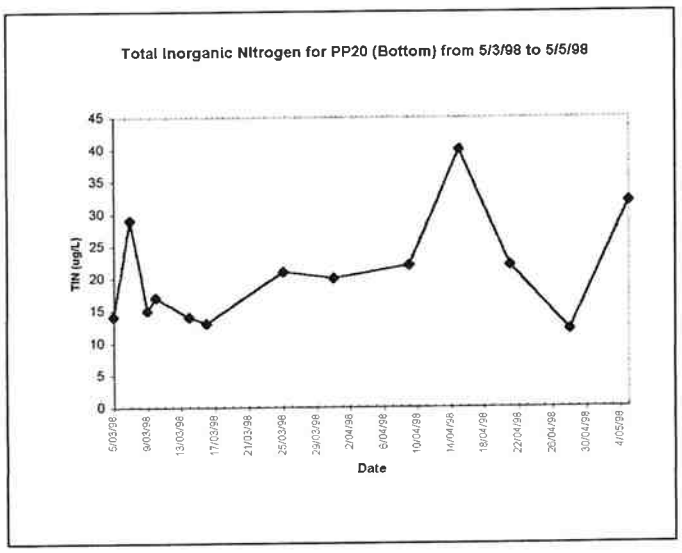
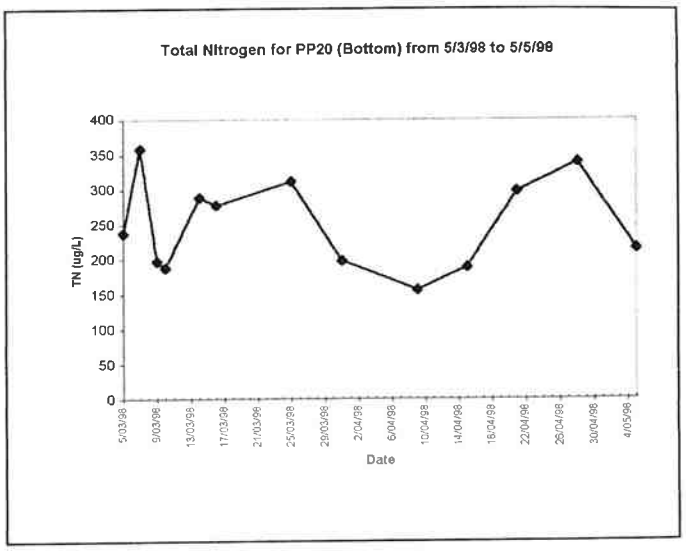
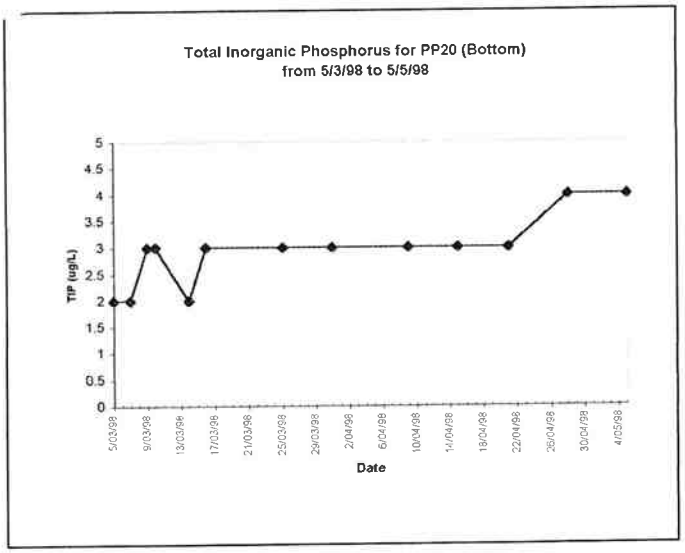
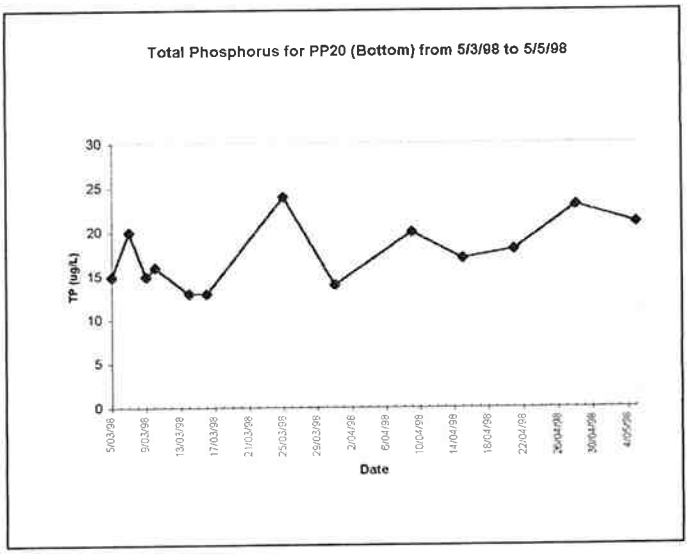


Figure 4 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP20 (Top) from the 5/3/98 to 5/5/98









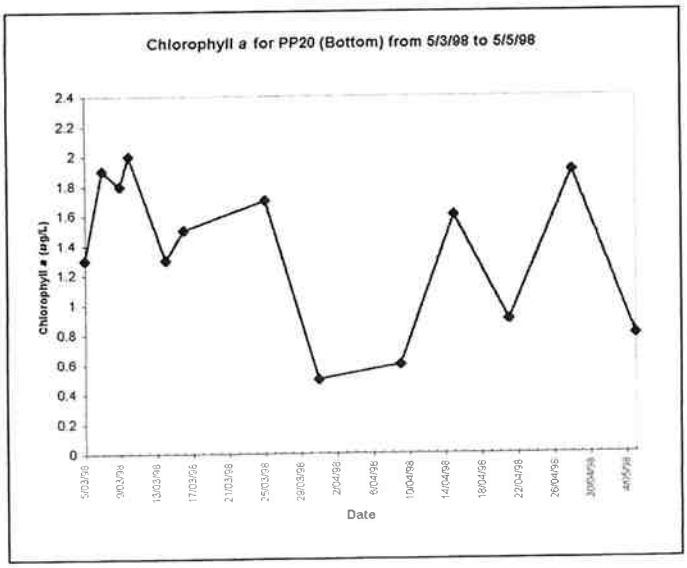
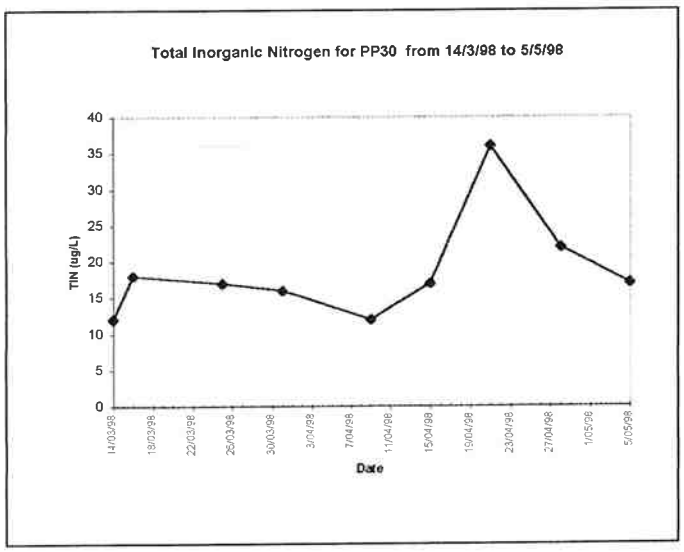
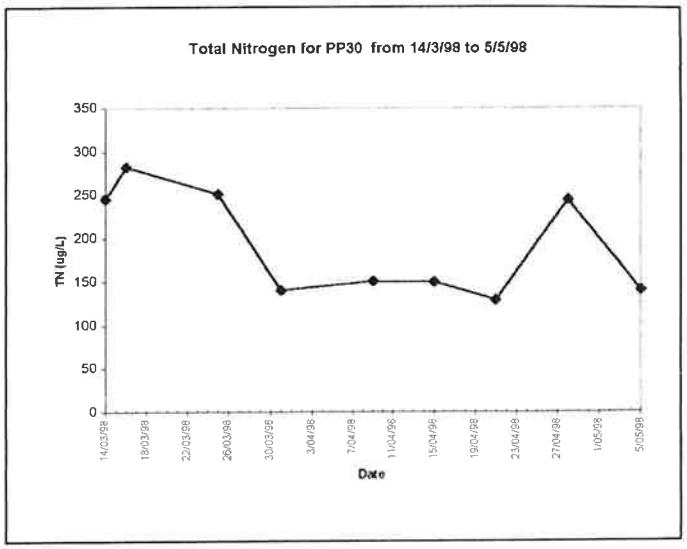
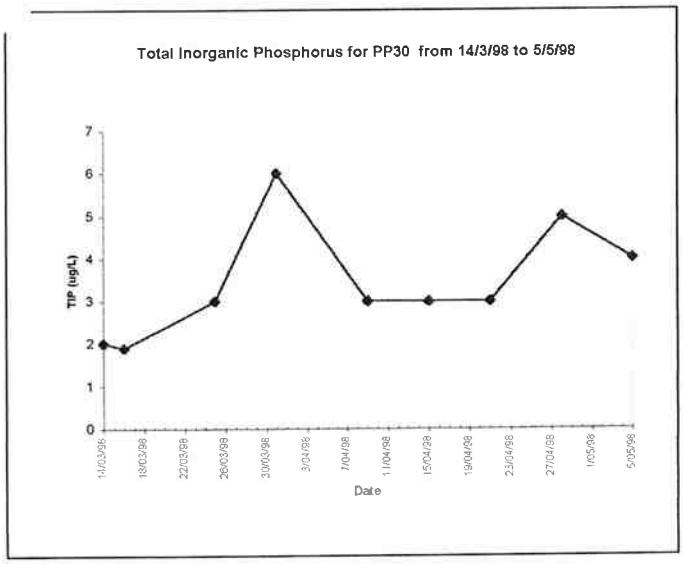
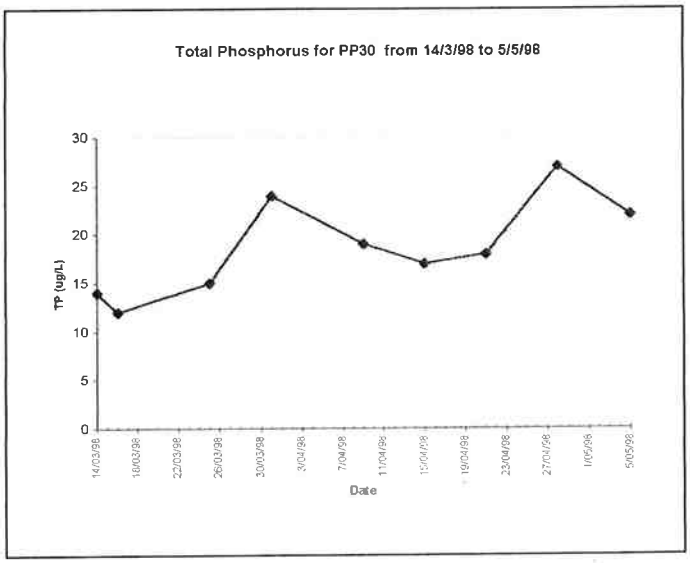


Figure 5 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP20 (Bottom) from the 5/3/98 to 5/5/98









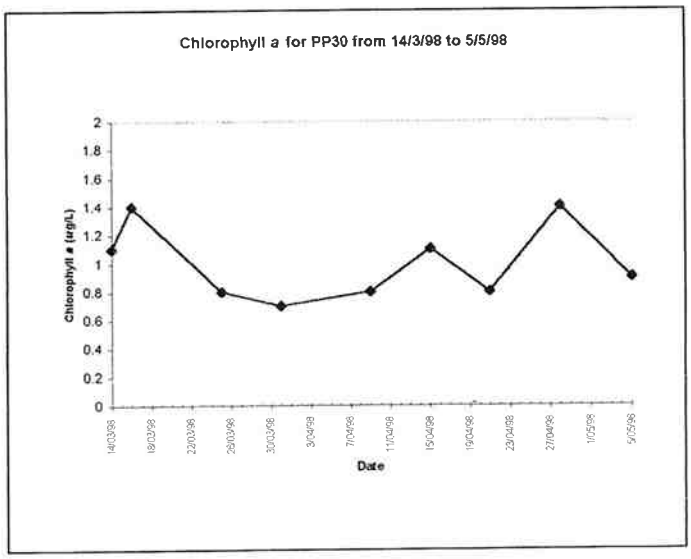
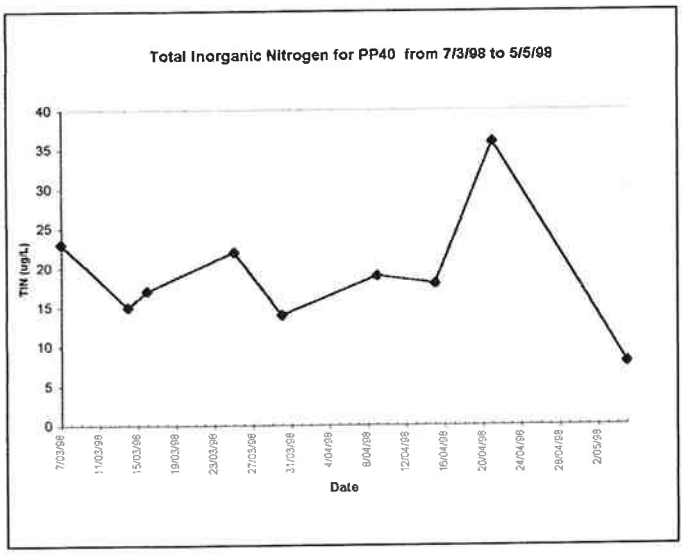
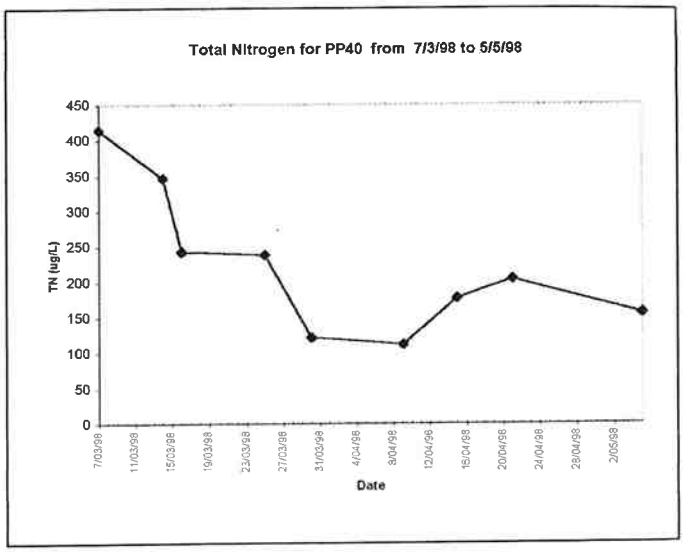
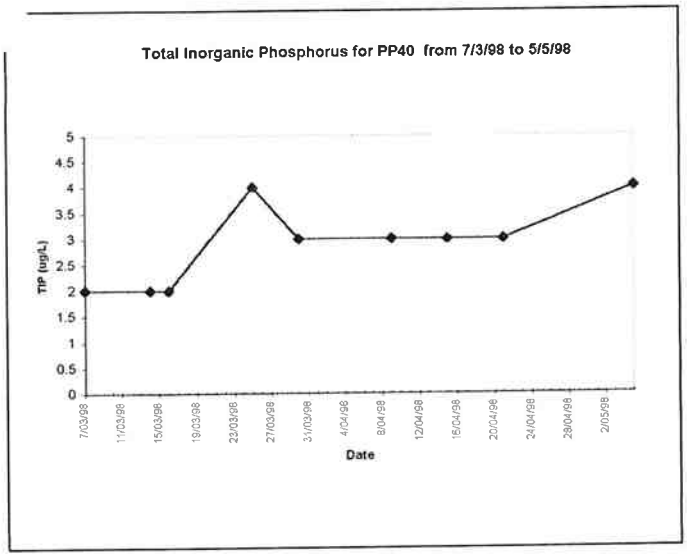
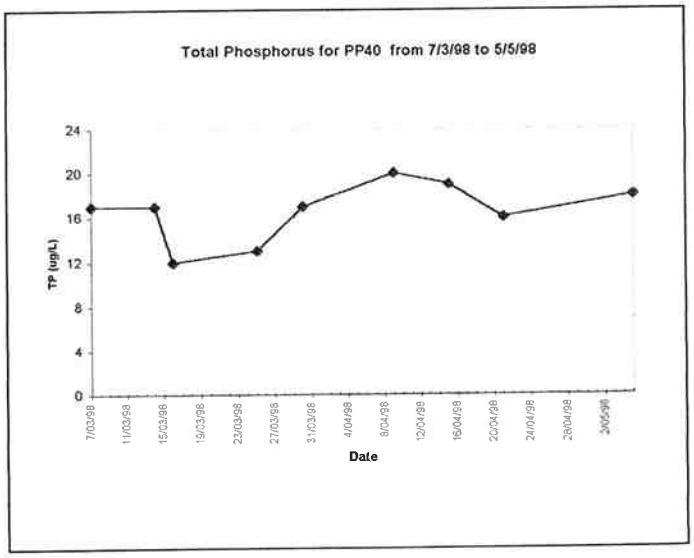


Figure 6 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP30 from the 14/3/98 to 5/5/98









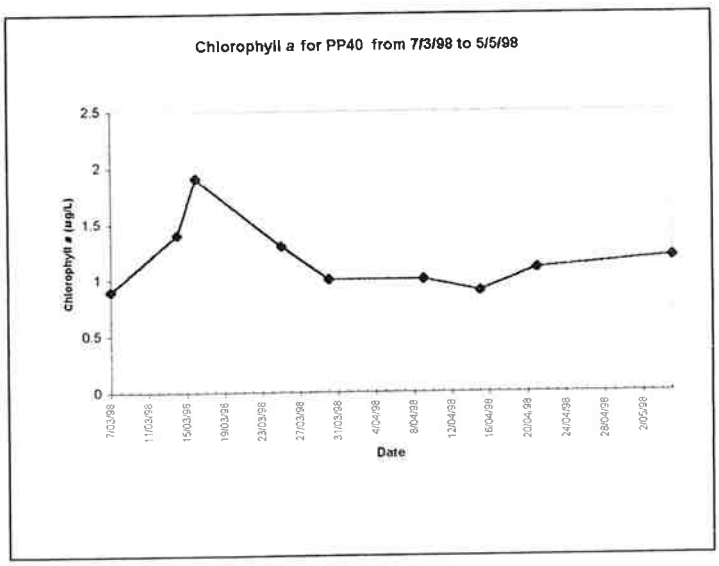
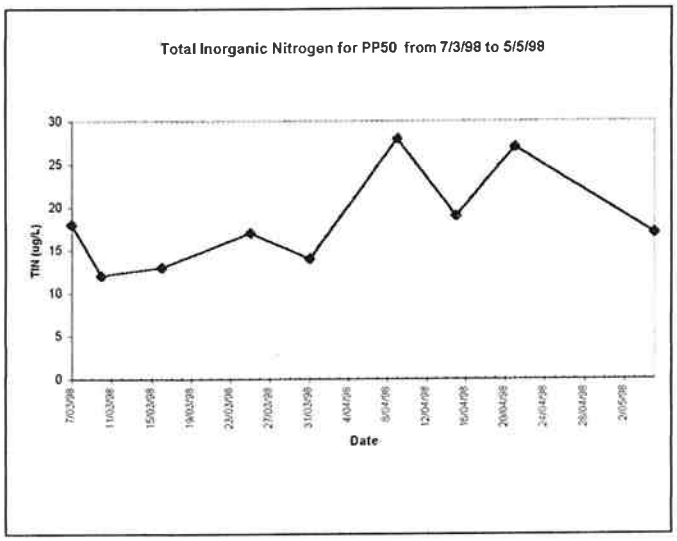
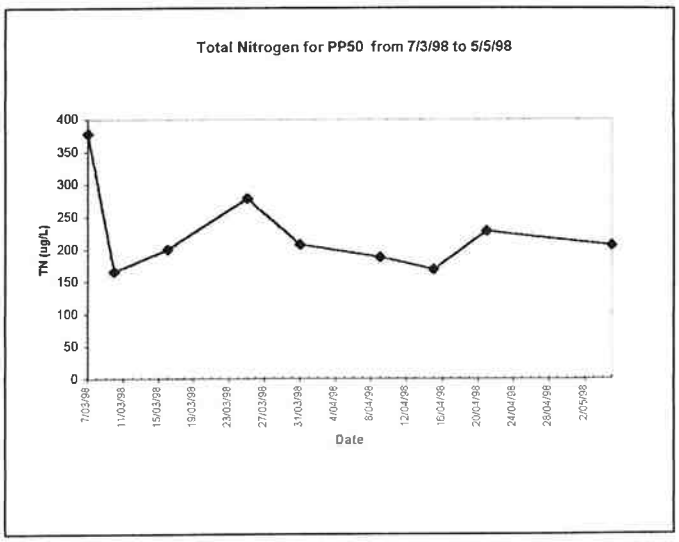
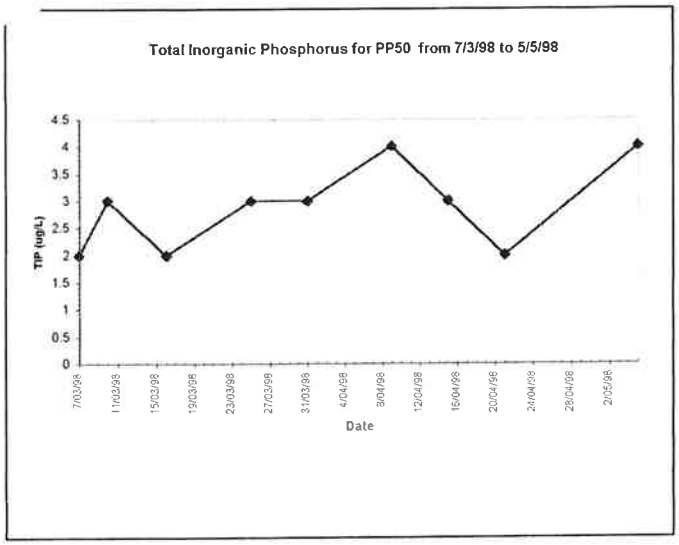
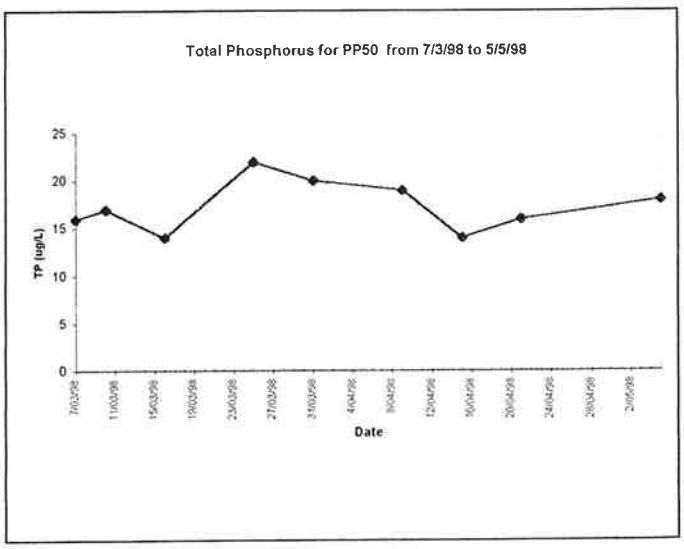


Figure 7 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP40 from the 7/3/98 to 5/5/98









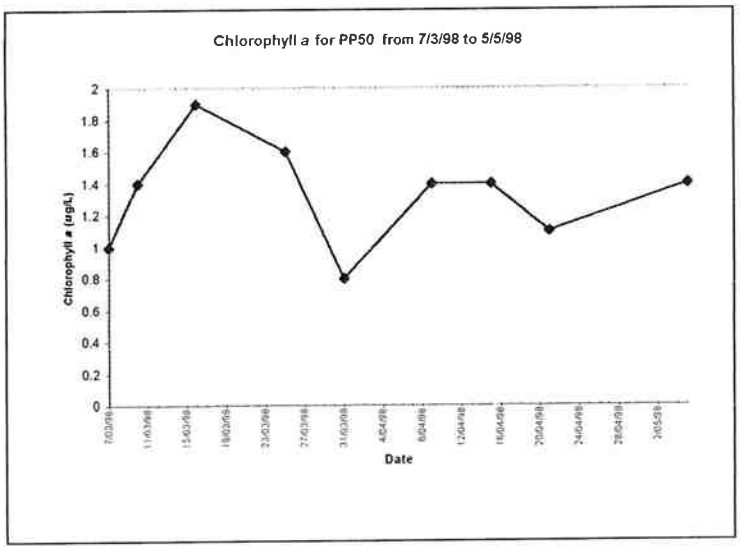
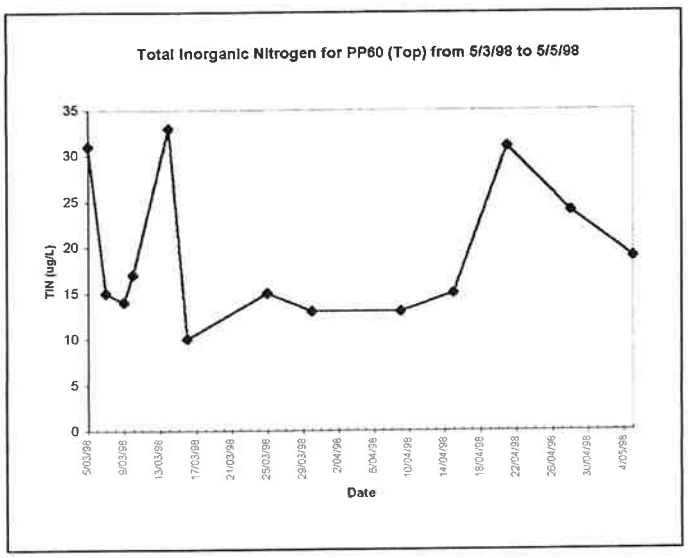
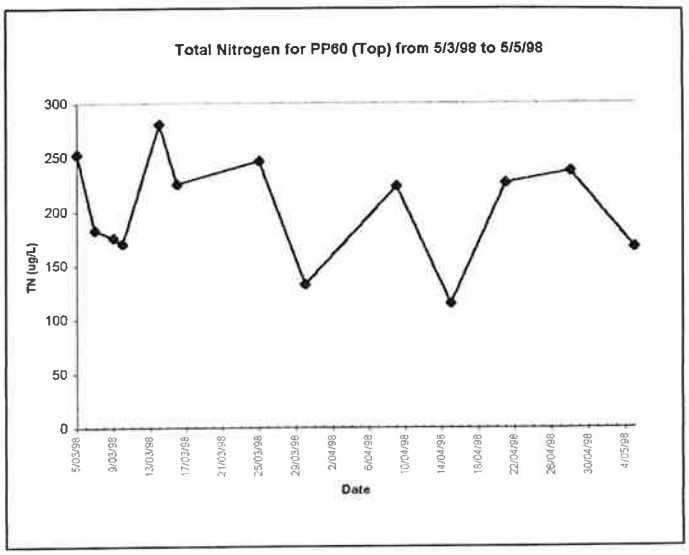
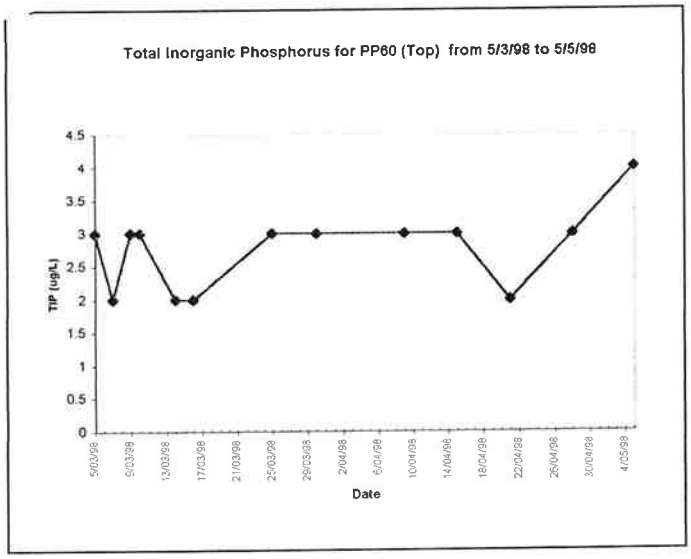
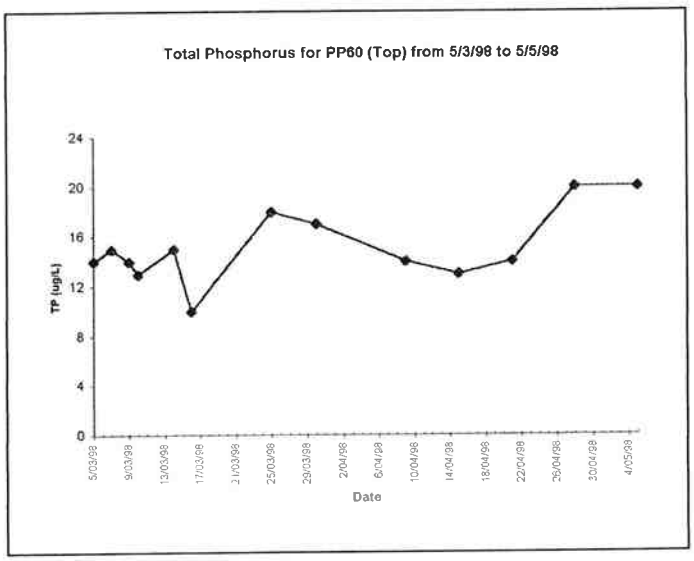


Figure 8 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP50 from the 7/3/98 to 5/5/98









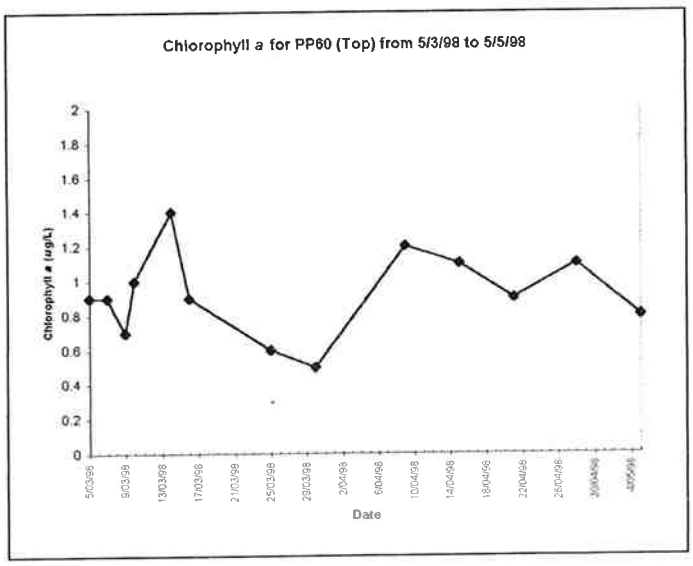
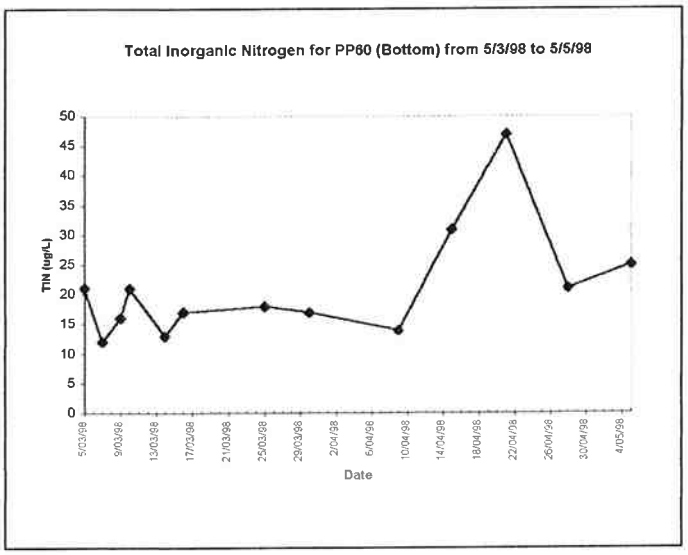
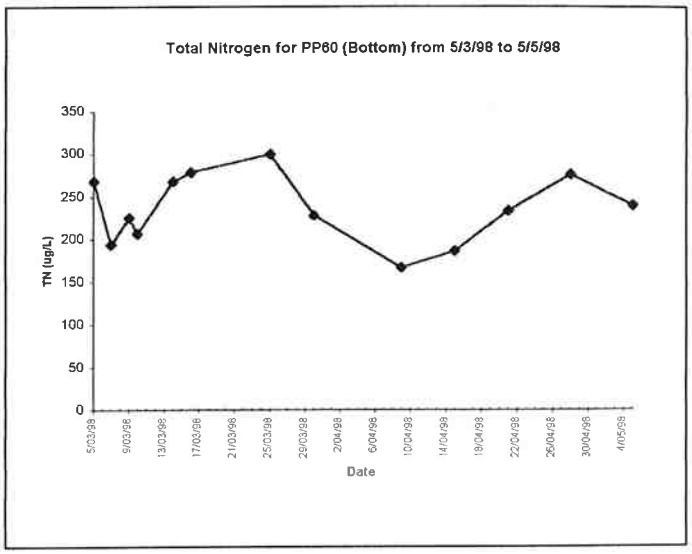
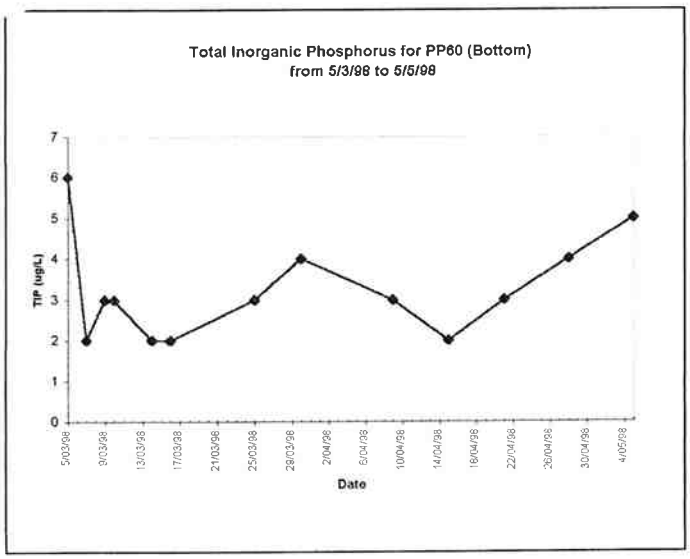
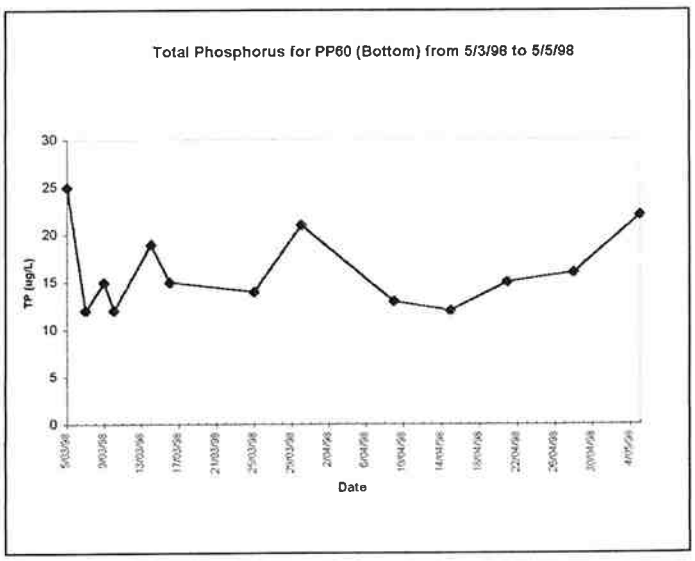


Figure 9 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP60 (Top) from the 5/3/98 to 5/5/98









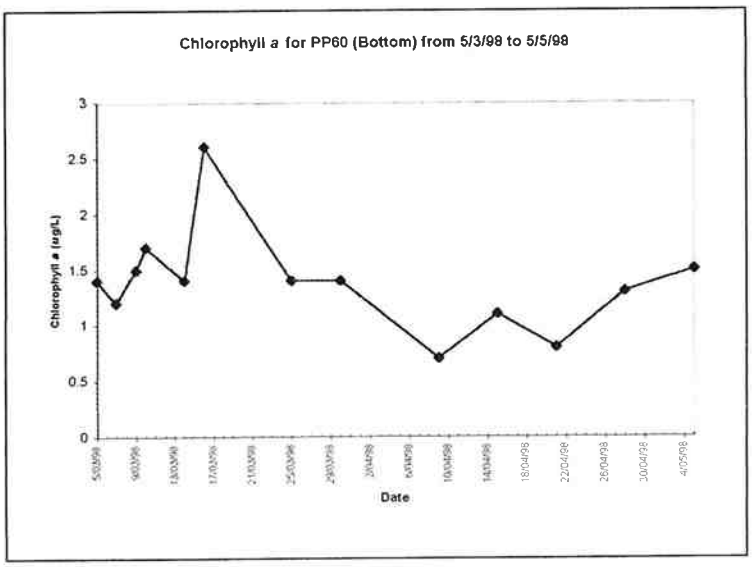
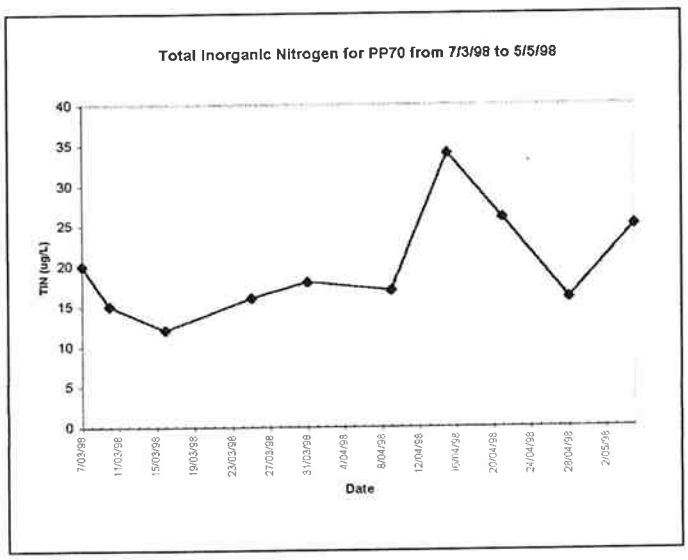
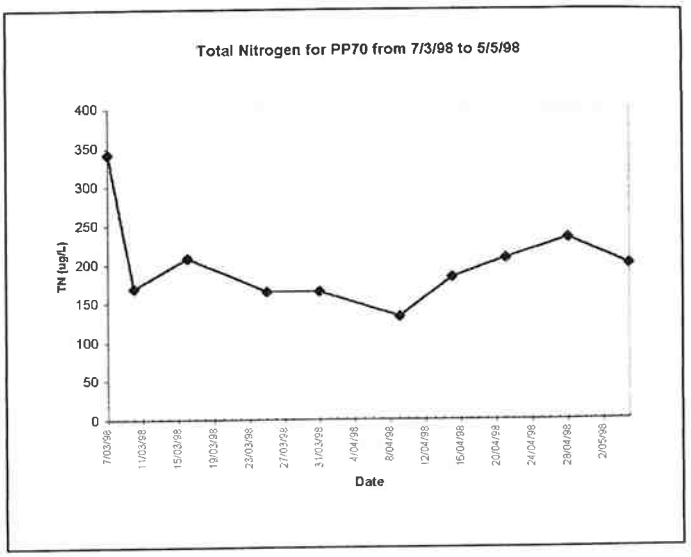
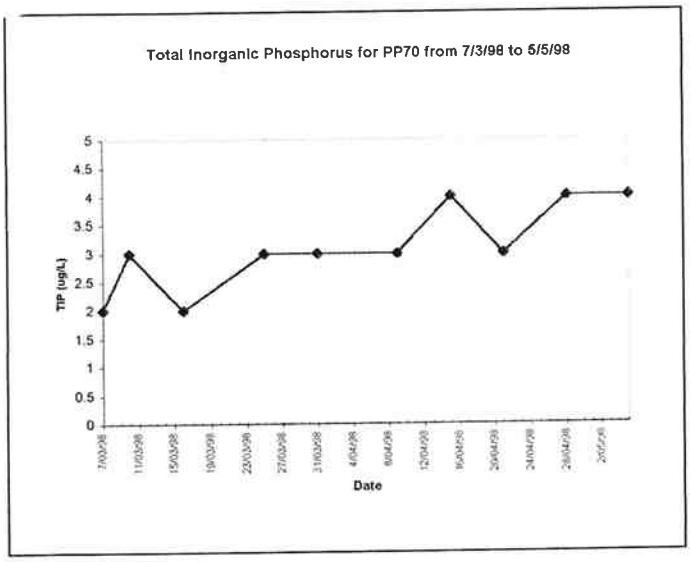
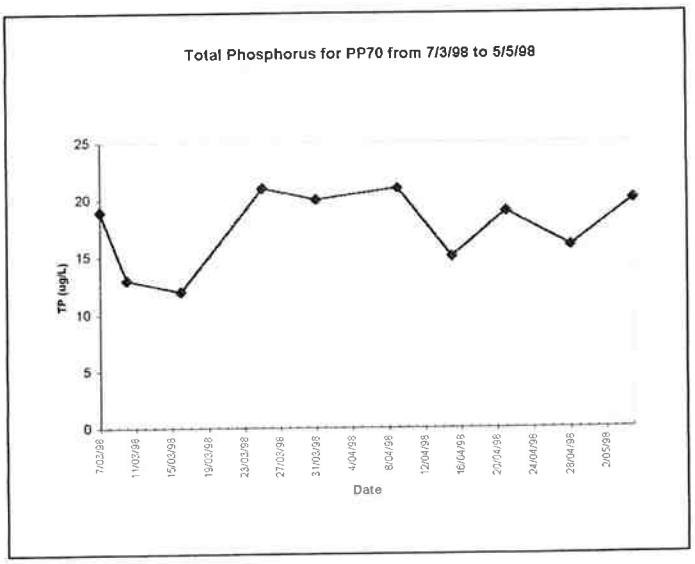


Figure 10 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP60 (Bottom) from the 5/3/98 to 5/5/98









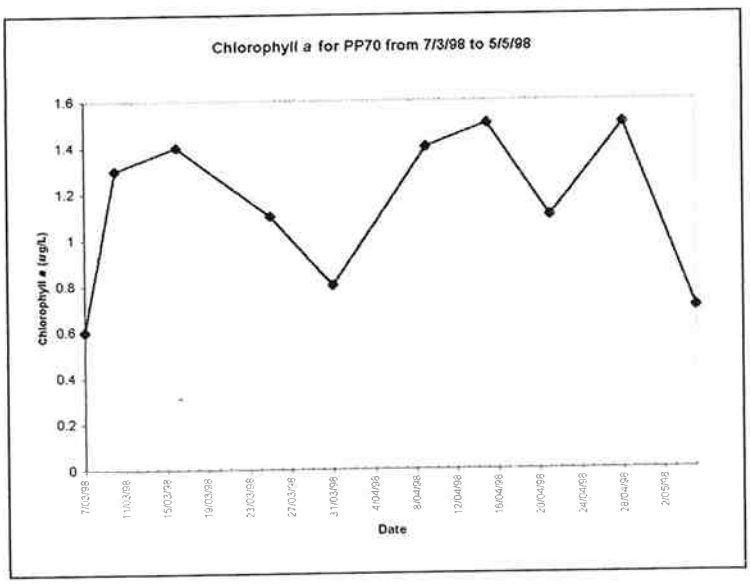


Figure 11 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP70 from the 7/3/98 to 5/5/98

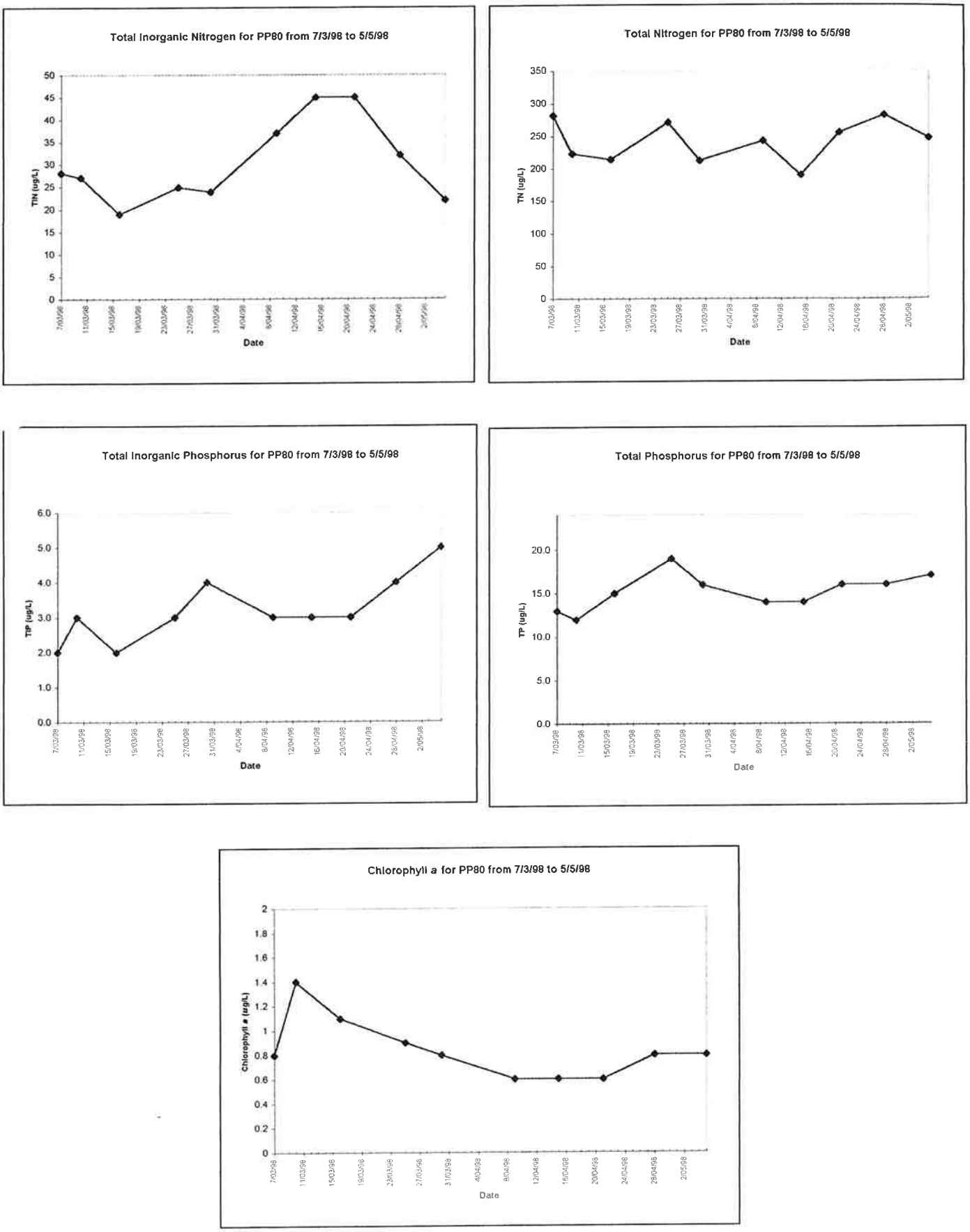
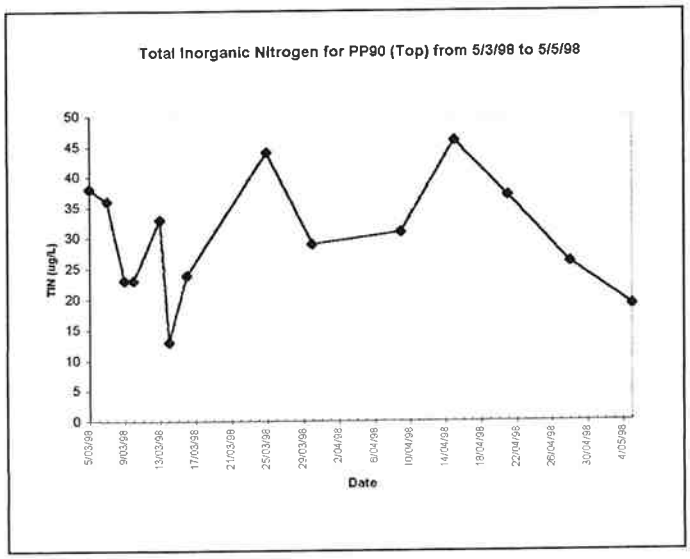
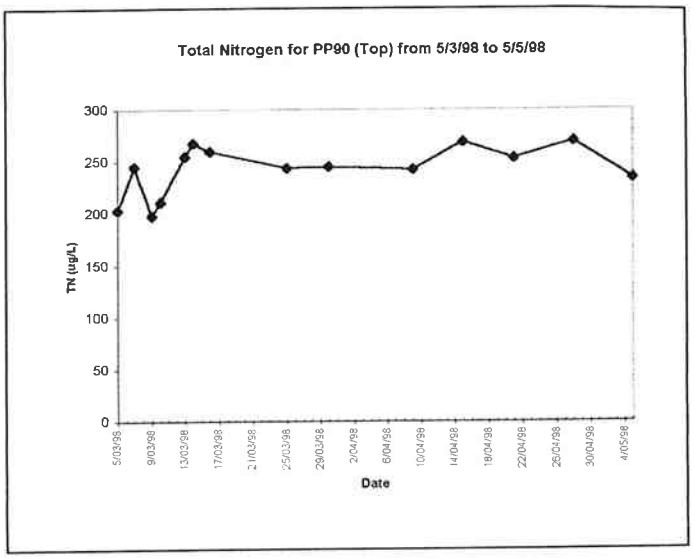
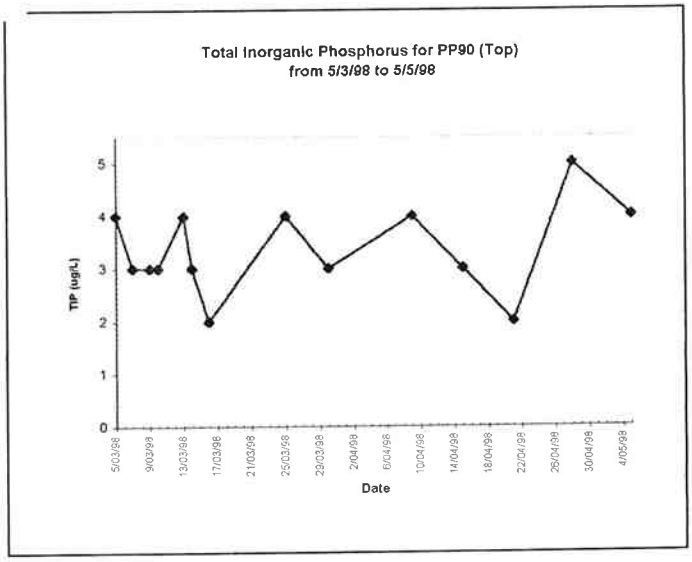
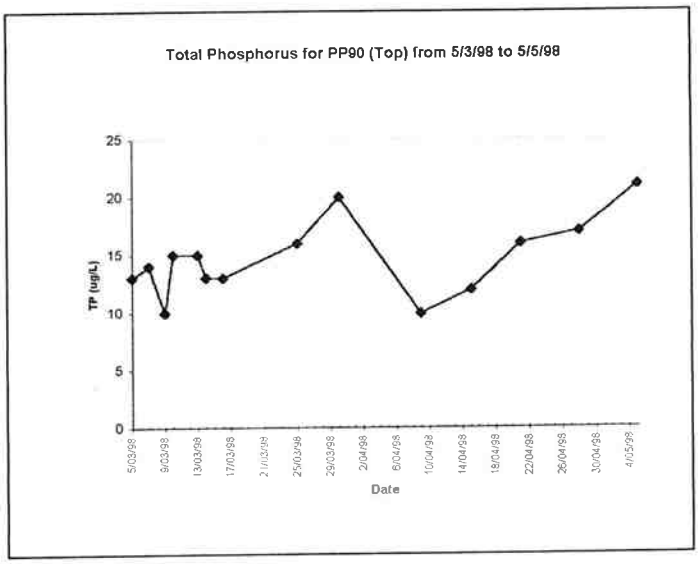


Figure 12 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP80 from the 7/3/98 to 5/5/98









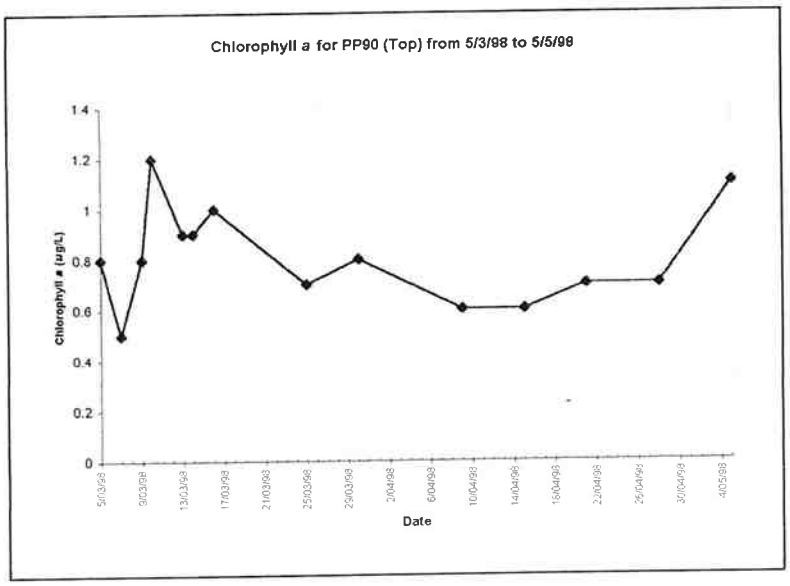
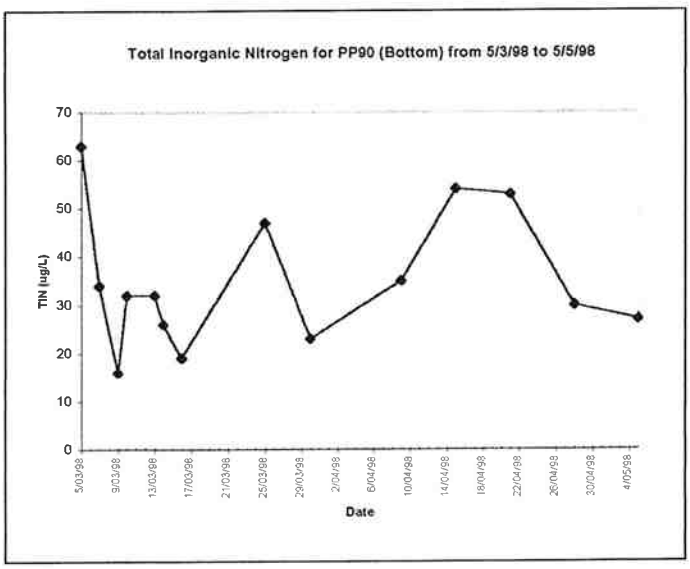
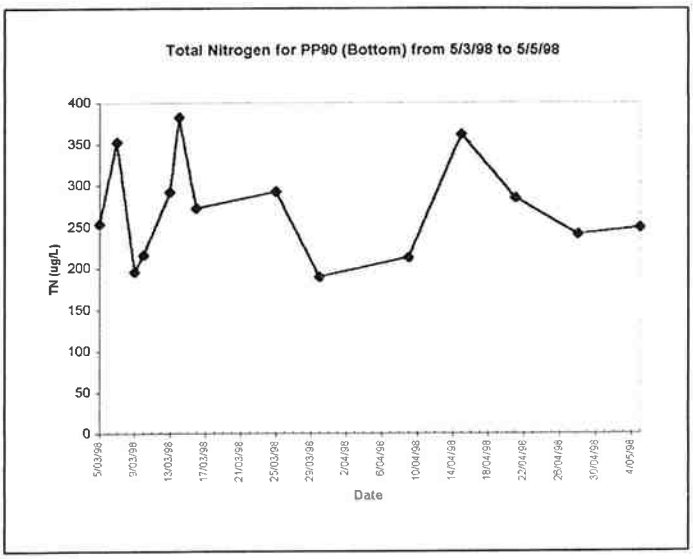
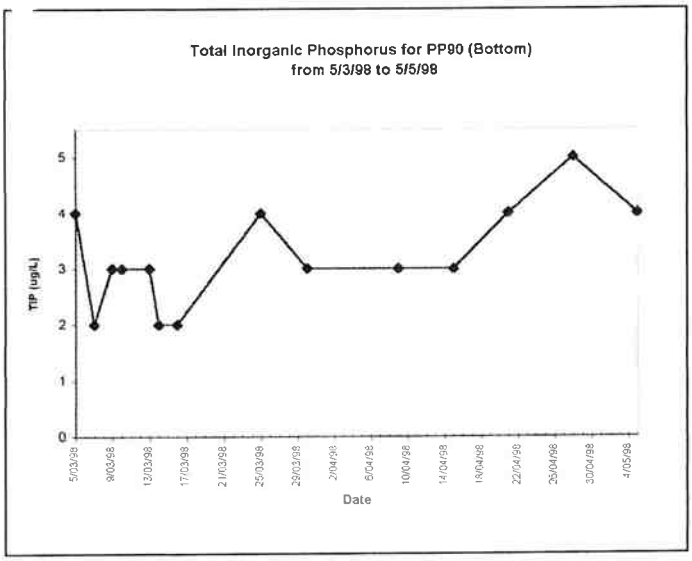
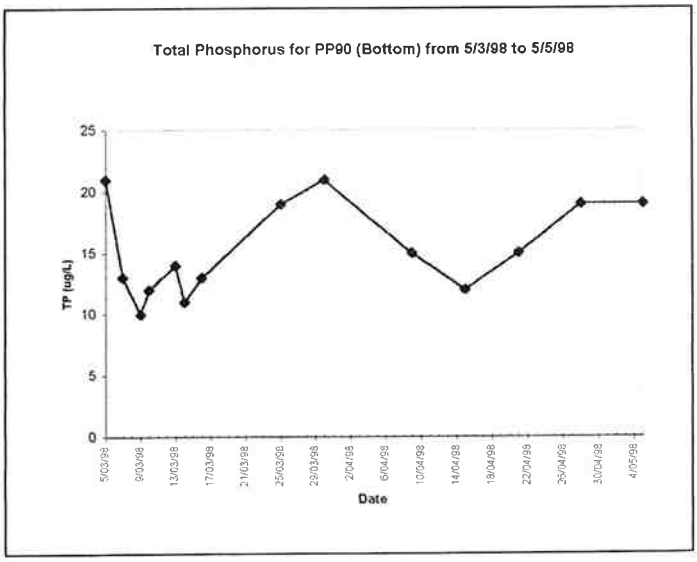


Figure 13 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP90 (Top) from the 5/3/98 to 5/5/98









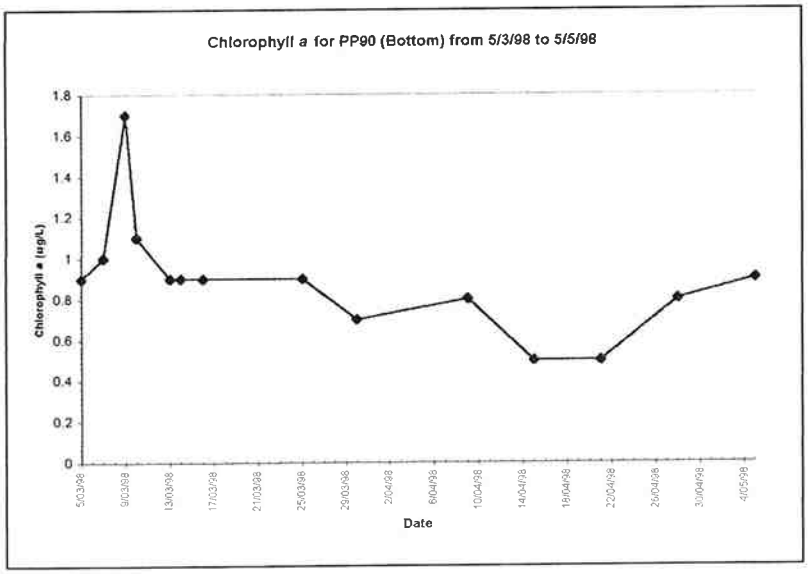
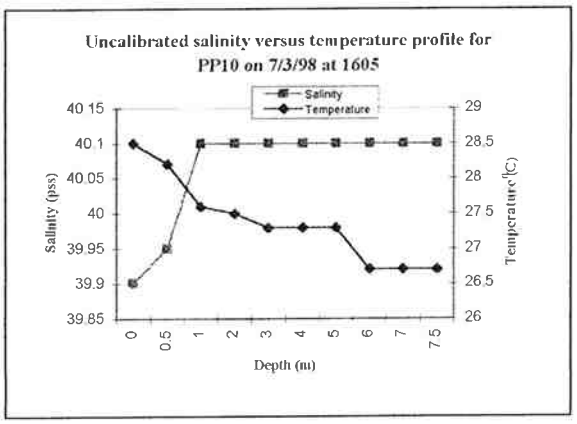
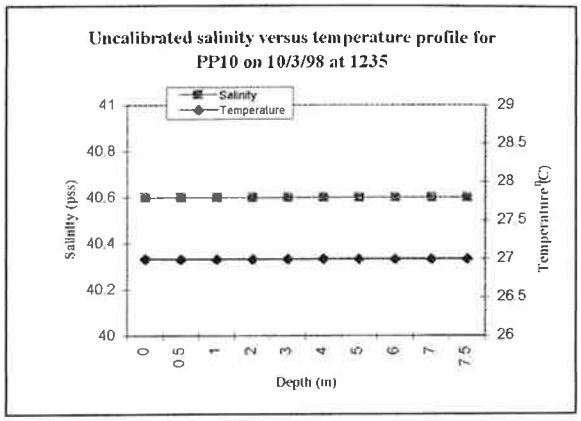
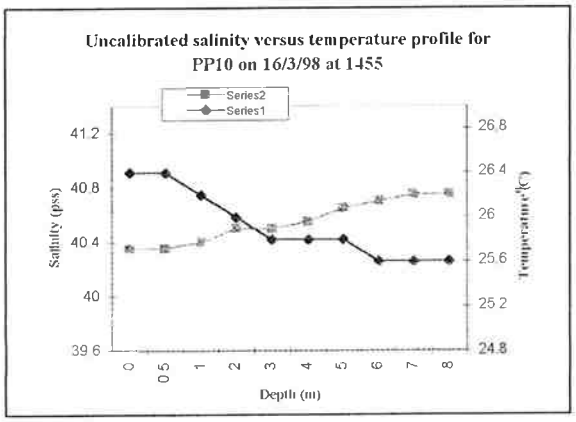


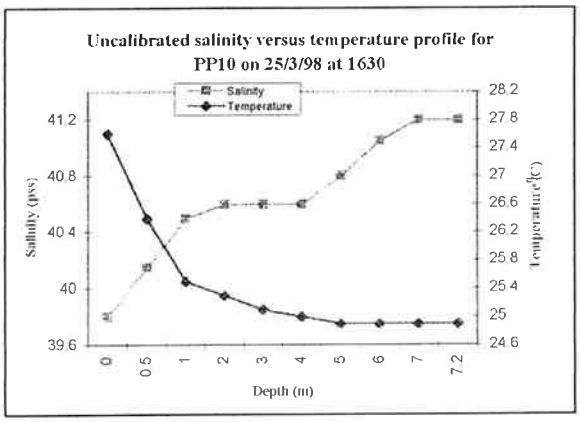
Figure 14 Total inorganic nitrogen, total nitrogen, total inorganic phosphorus, total phosphorus and chlorophyll *a* results for PP90 (Bottom) from the 5/3/98 to 5/5/98

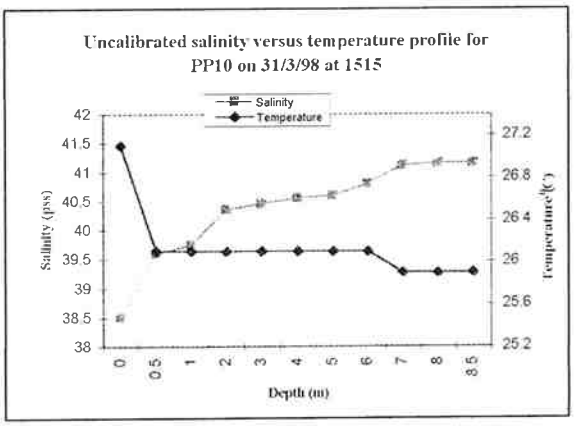
Uncalibrated salinity versus uncalibrated temperature profiles

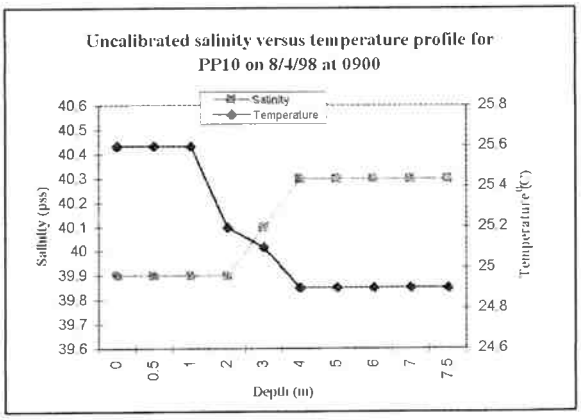


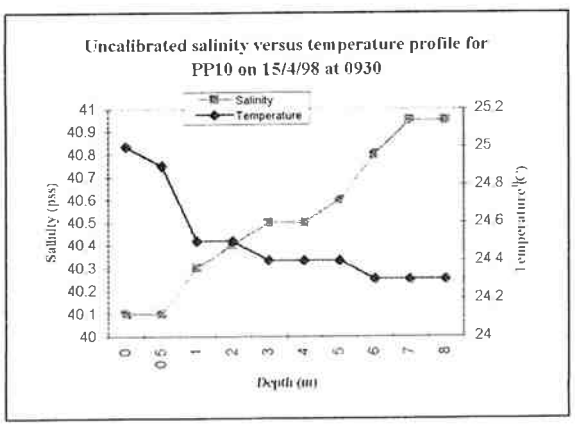












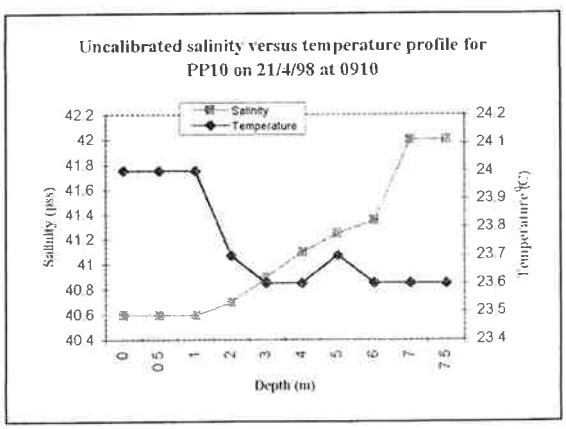
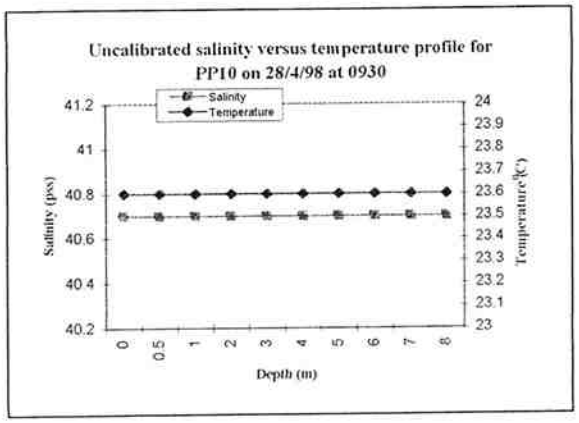


Figure 15 Salinity versus temperature profiles for PP10 from 7/3/98 to 5/5/98



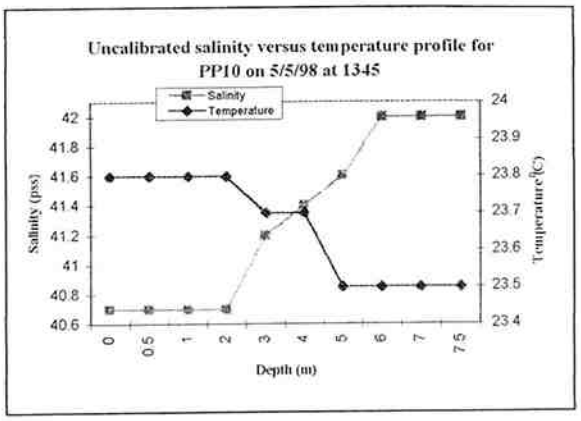
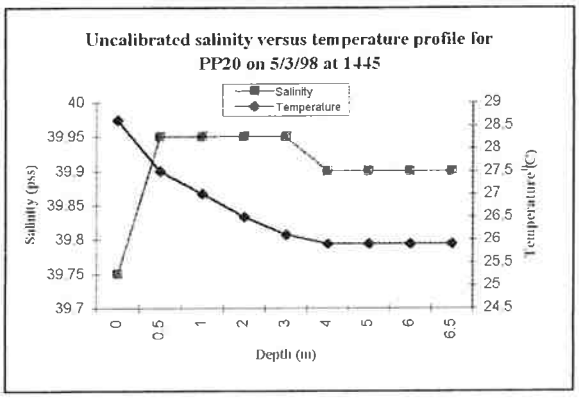
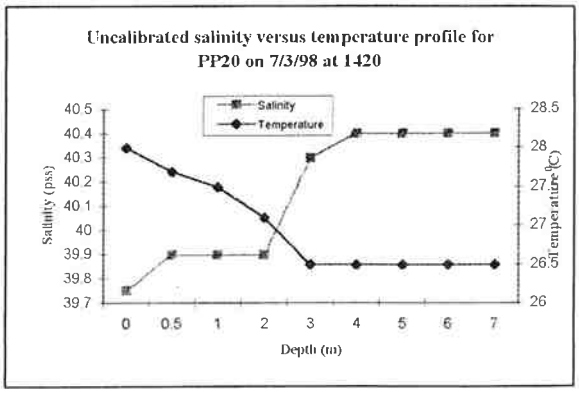
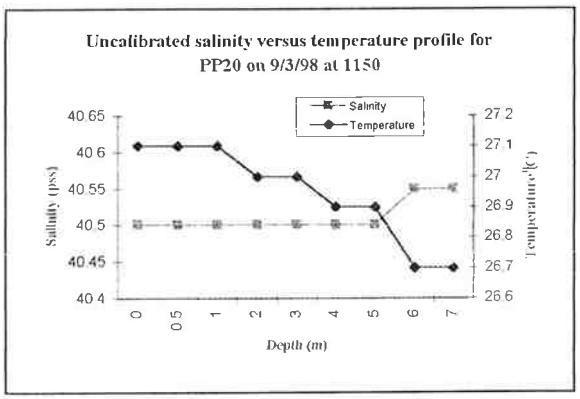
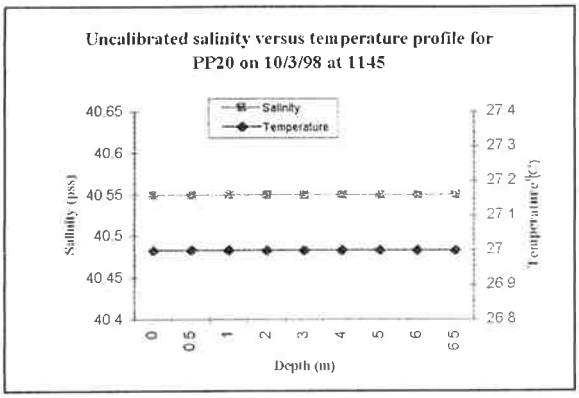


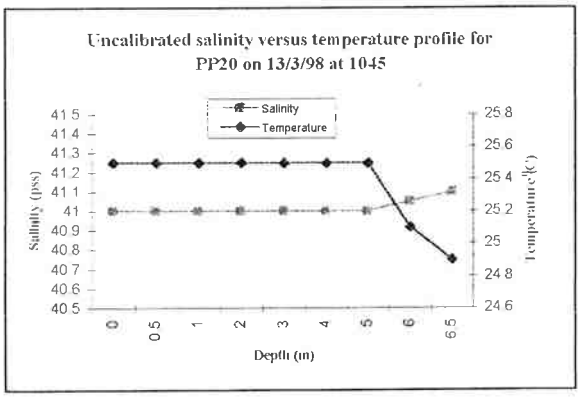
Figure 15 (continued)

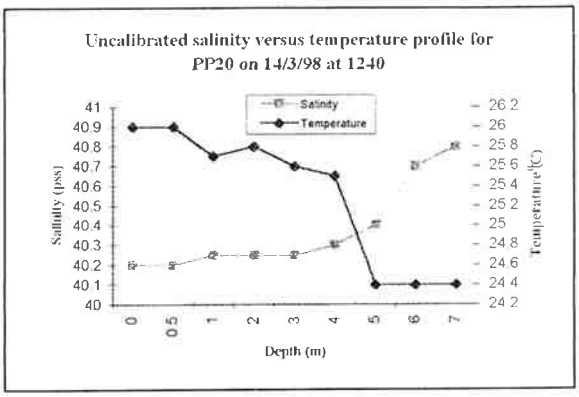


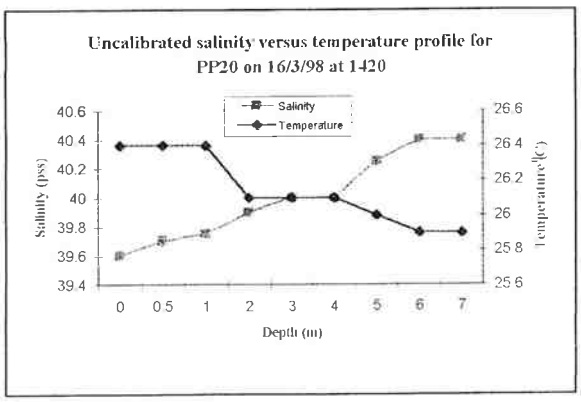












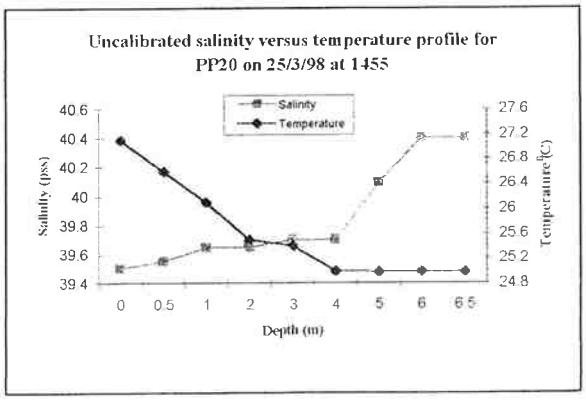
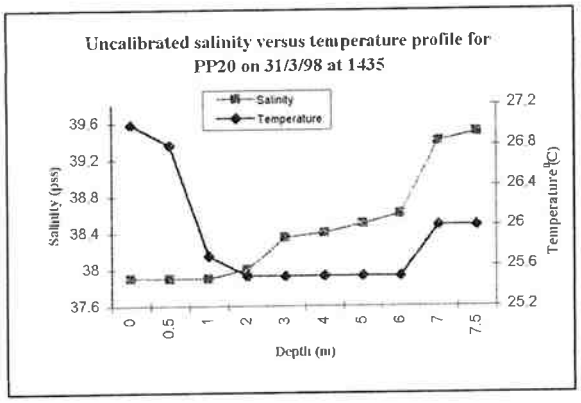
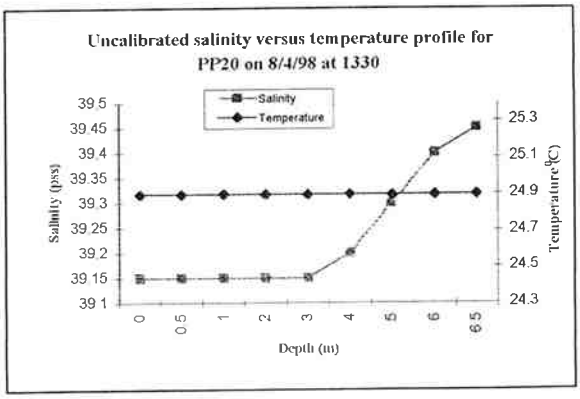
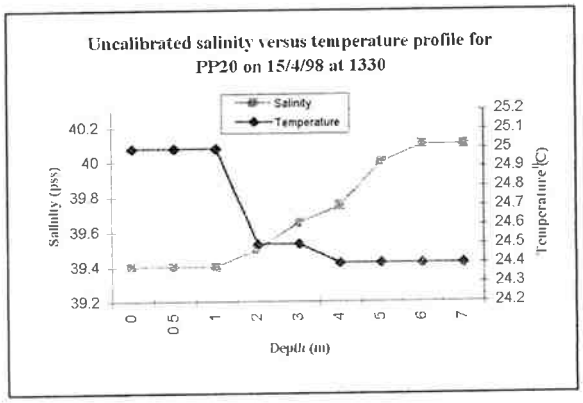
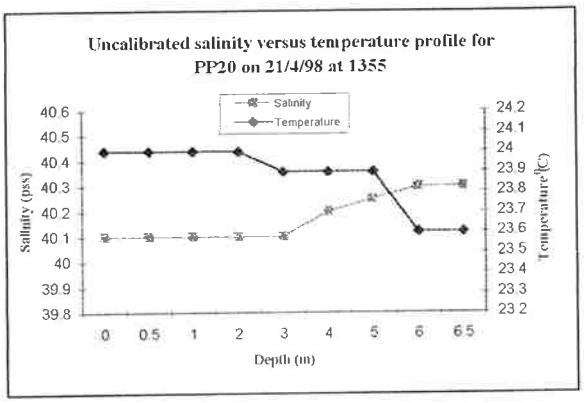


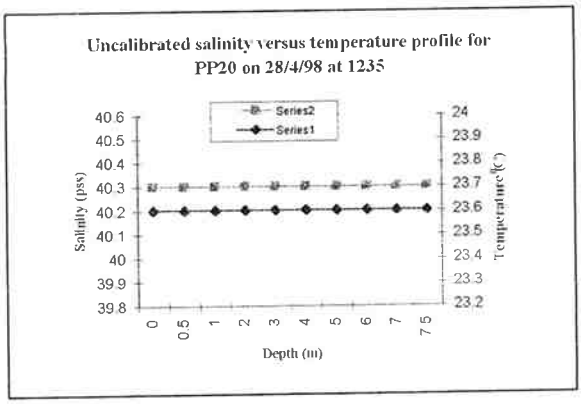
Figure 16 Salinity versus temperature profiles for PP20 from 5/3/98 to 5/5/98











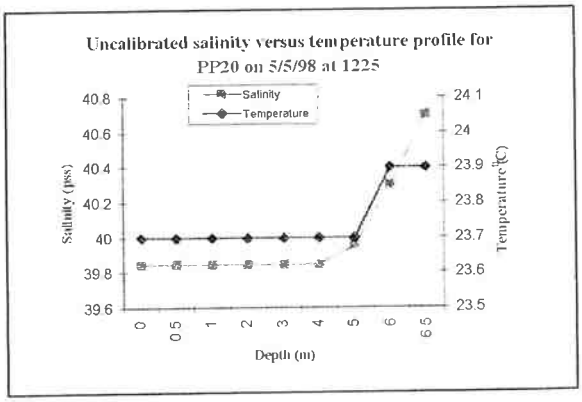
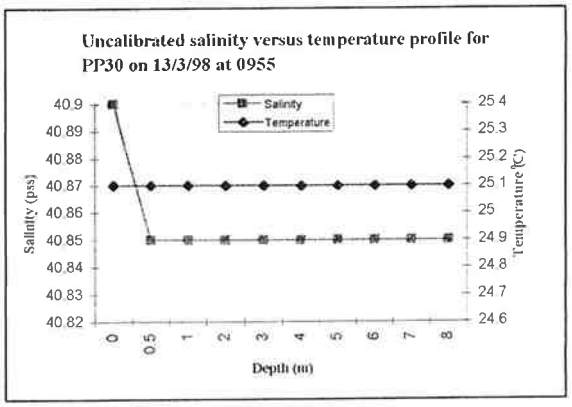
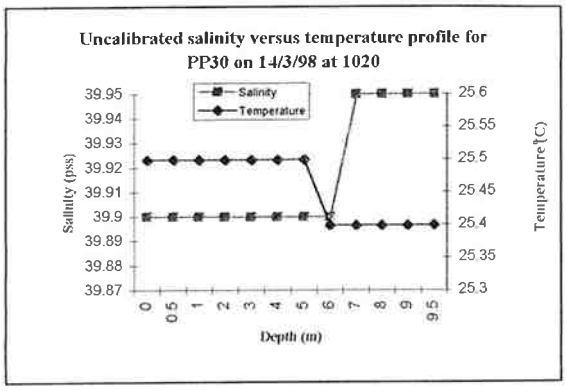
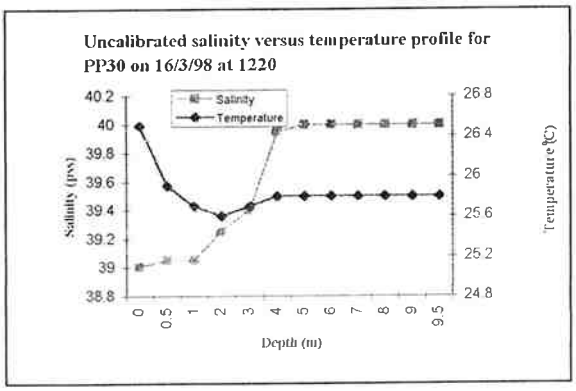
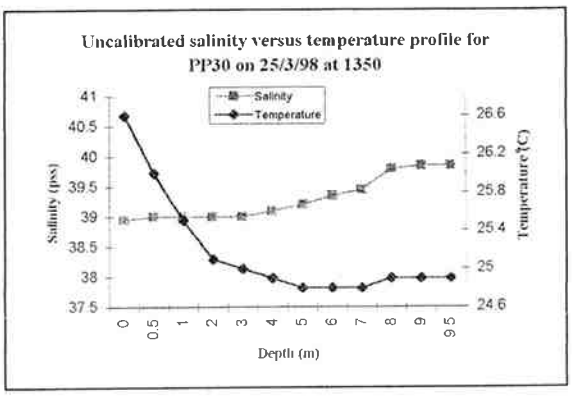


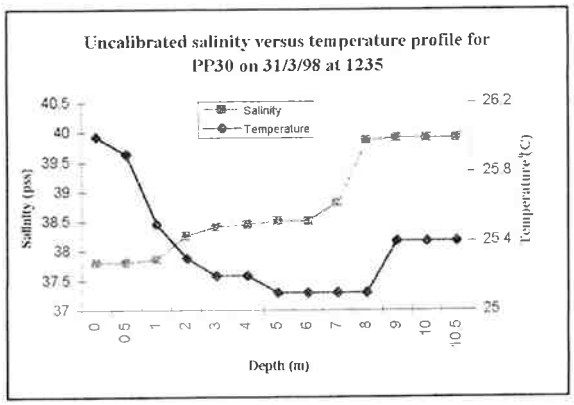
Figure 16 (continued)

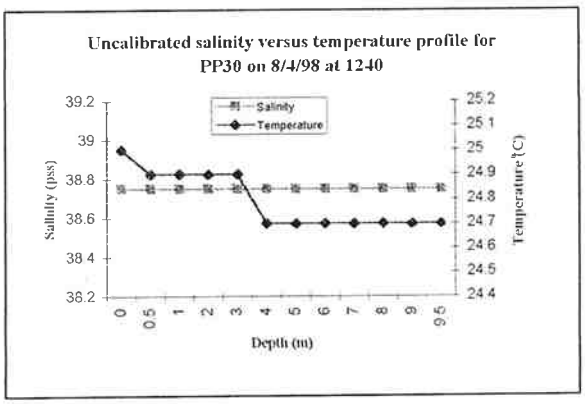


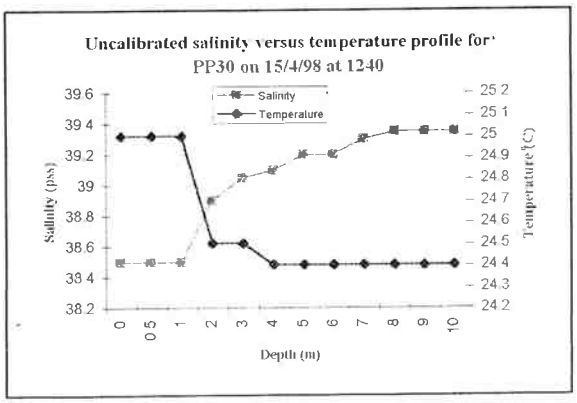












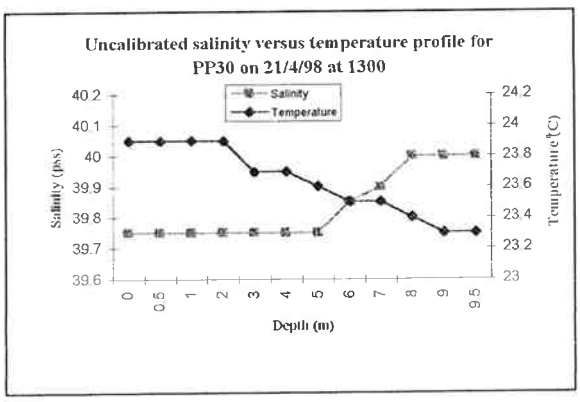
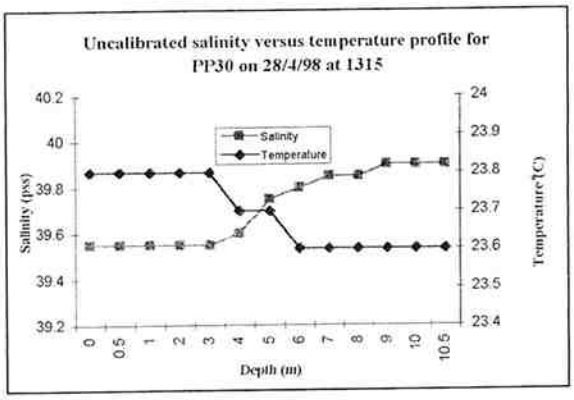


Figure 17 Salinity versus temperature profiles for PP30 from 13/3/98 to 5/5/98



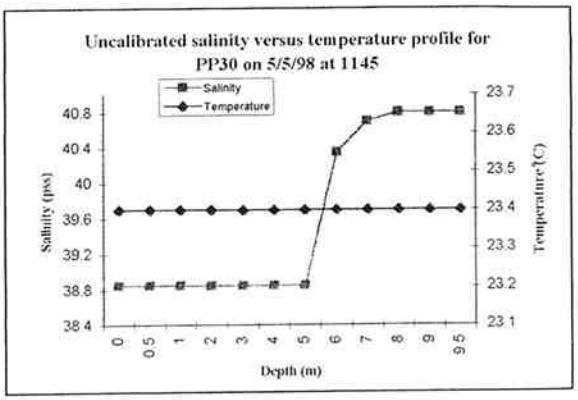
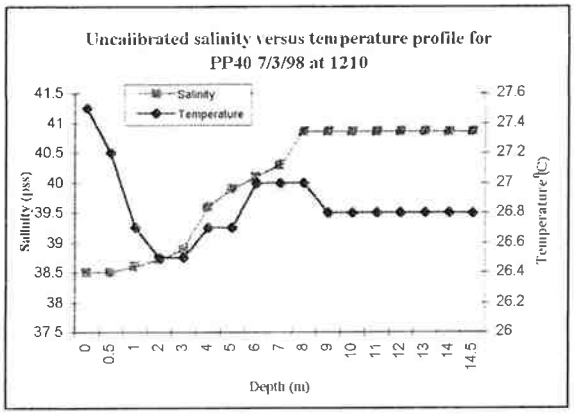
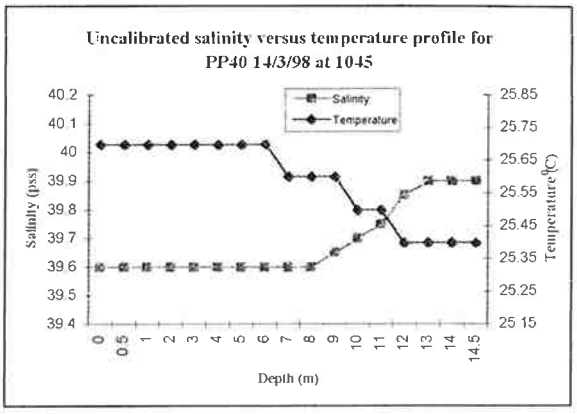
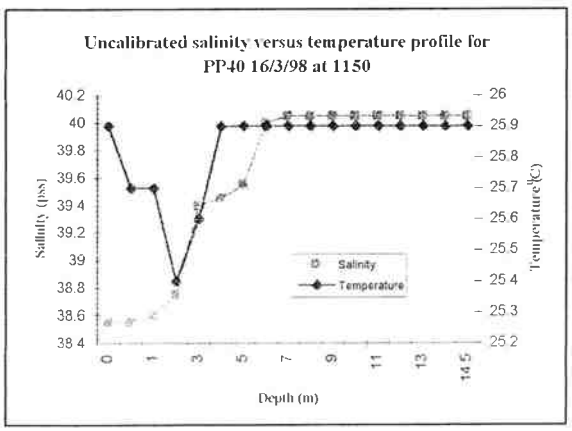
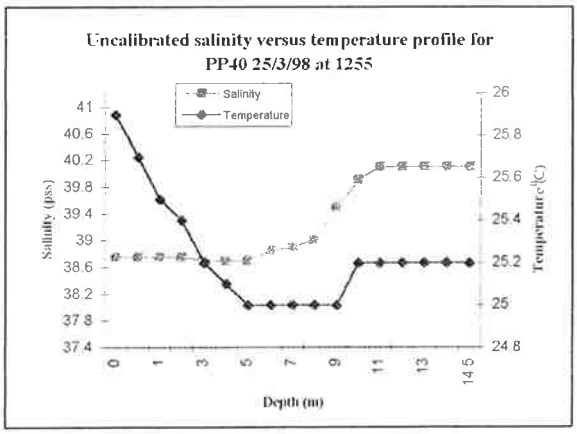


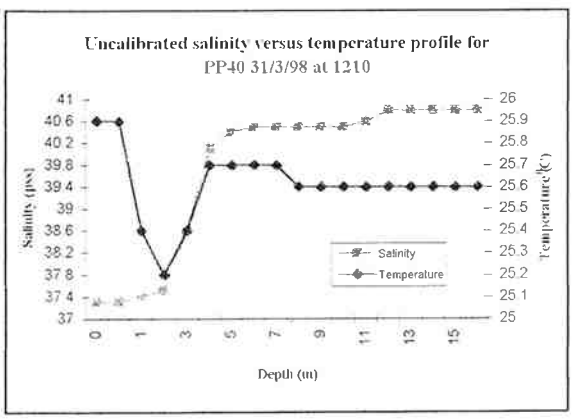
Figure 17 (continued)

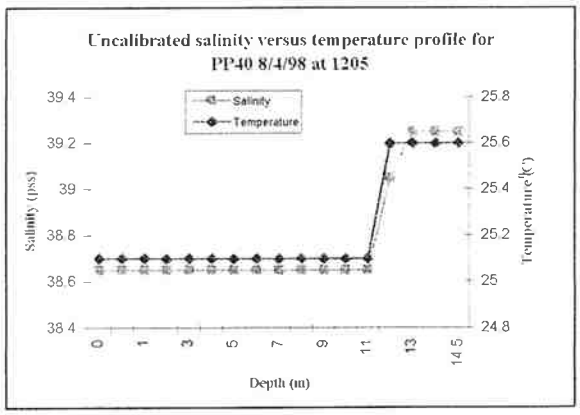


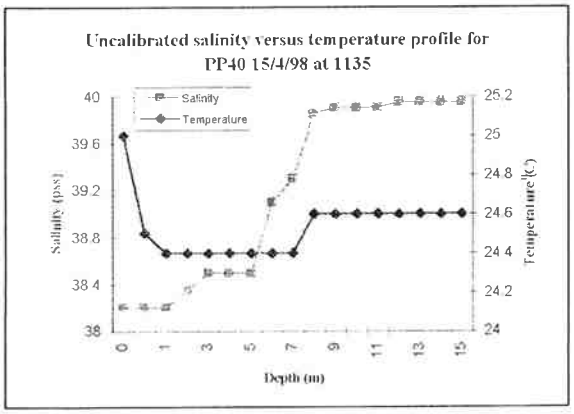












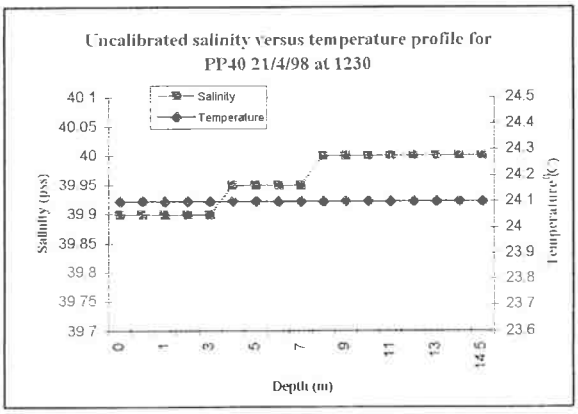


Figure 18 Salinity versus temperature profiles for PP40 from 7/3/98 to 5/5/98

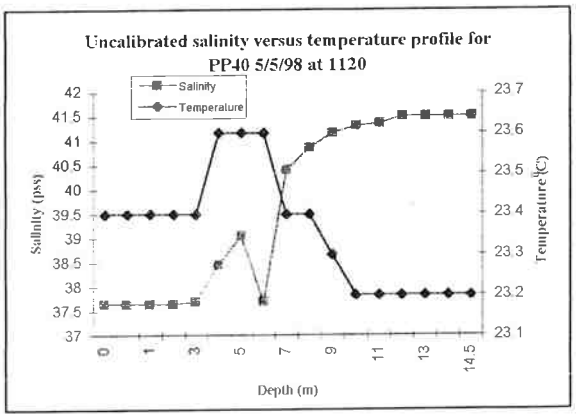
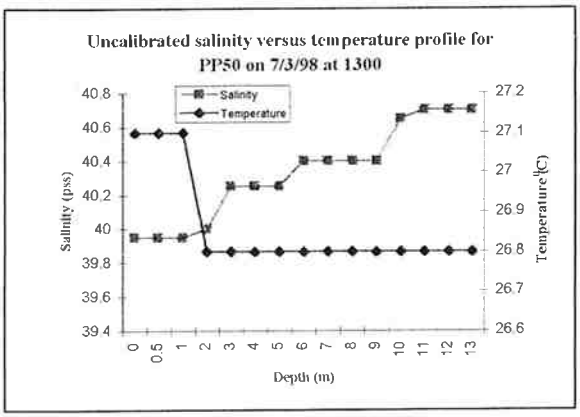
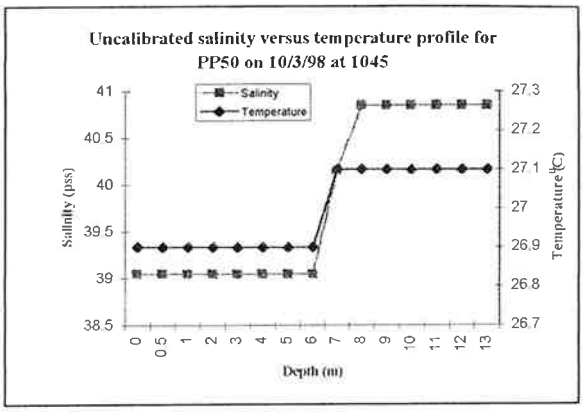
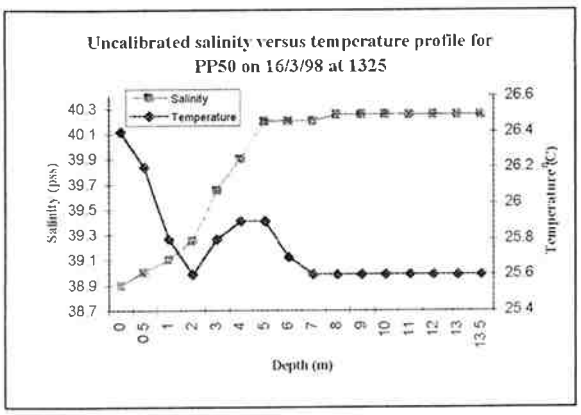
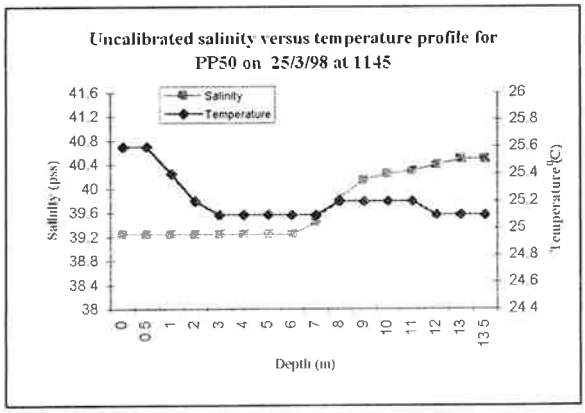


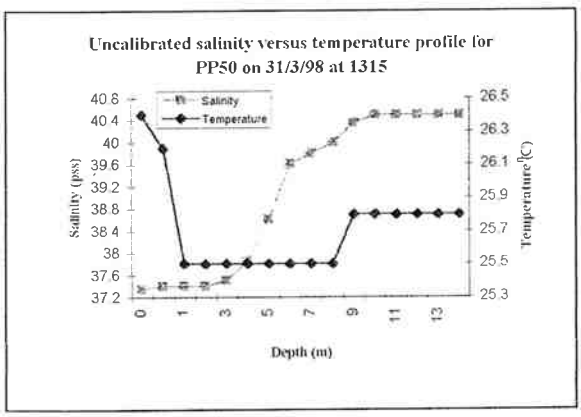
Figure 18 (continued)

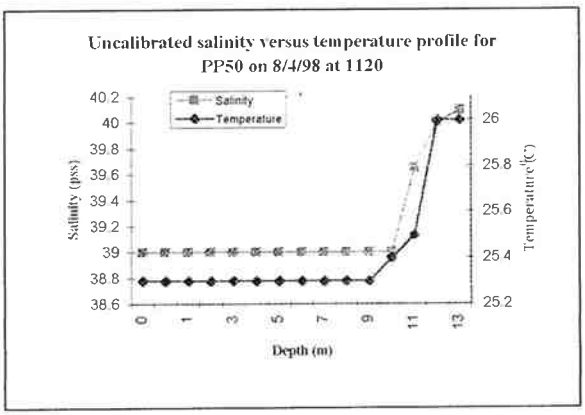


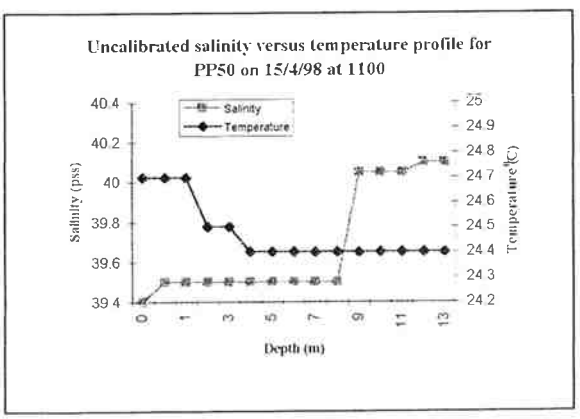












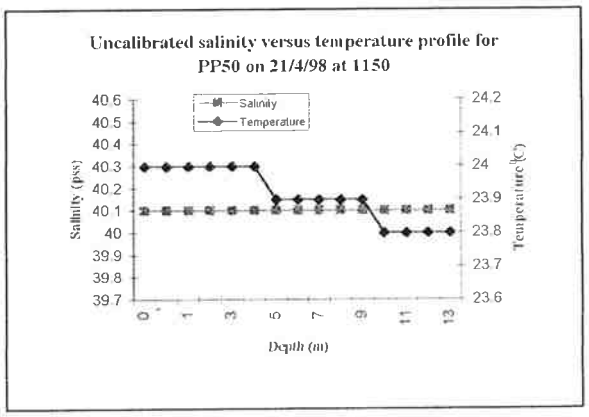


Figure 19 Salinity versus temperature profiles for PP50 from 7/3/98 to 5/5/98

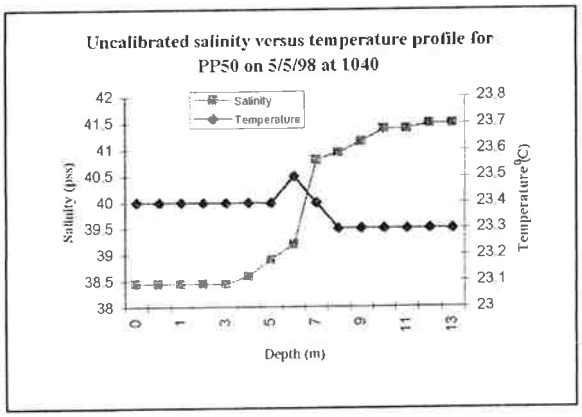
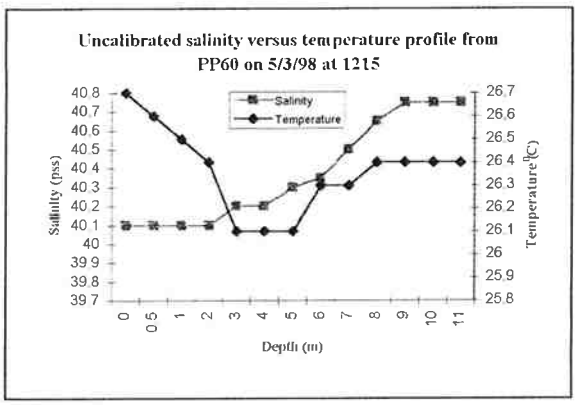
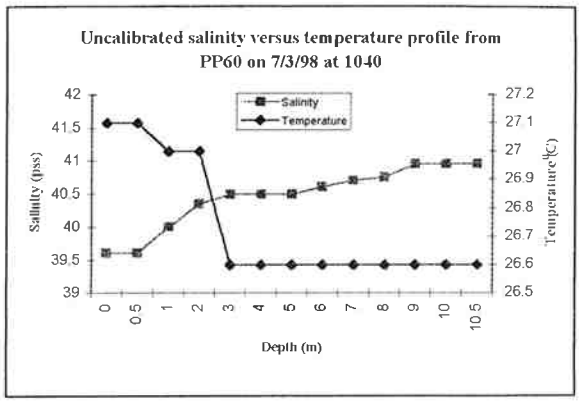
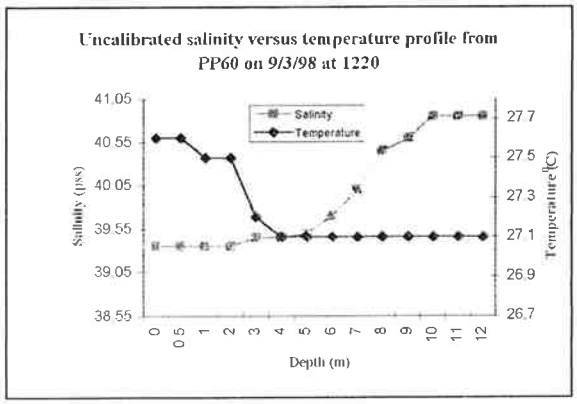
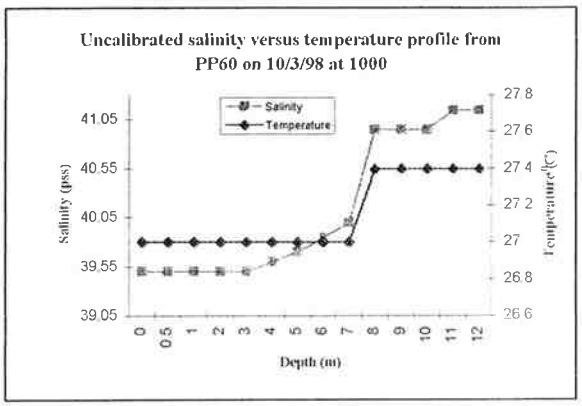


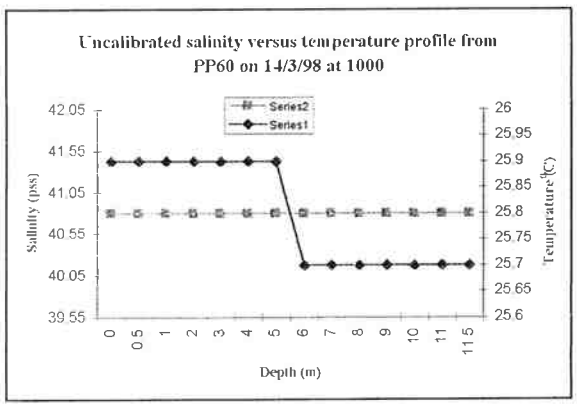
Figure 19 (continued)

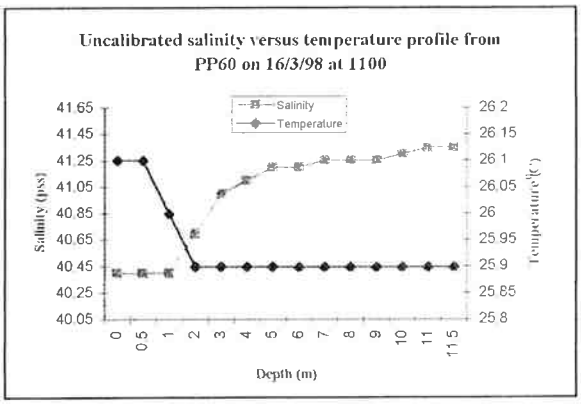


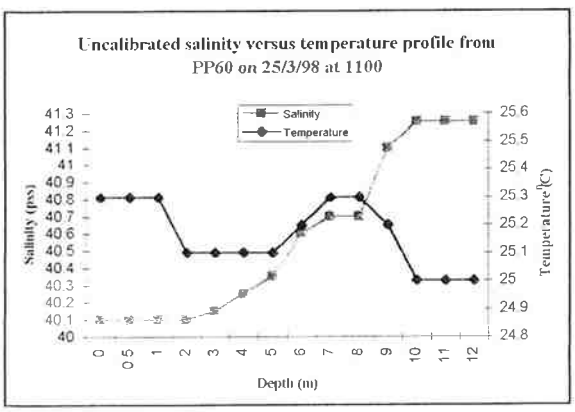












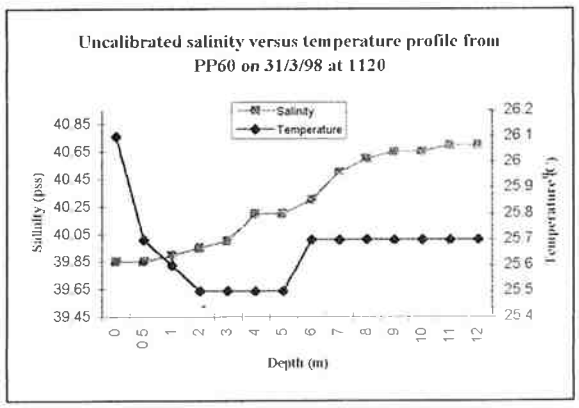
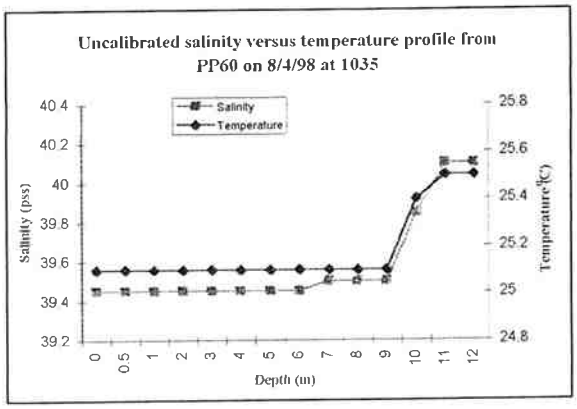
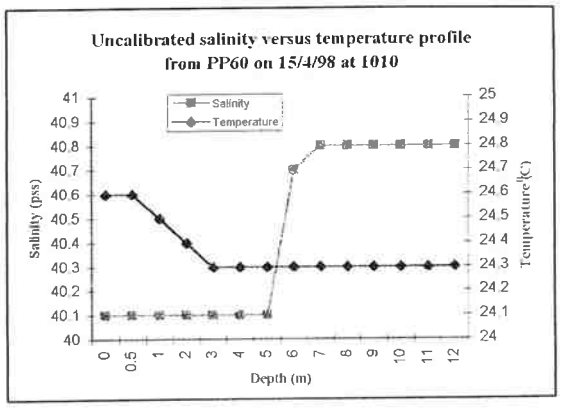
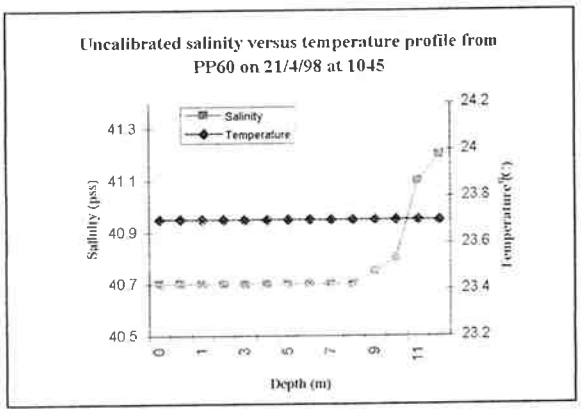
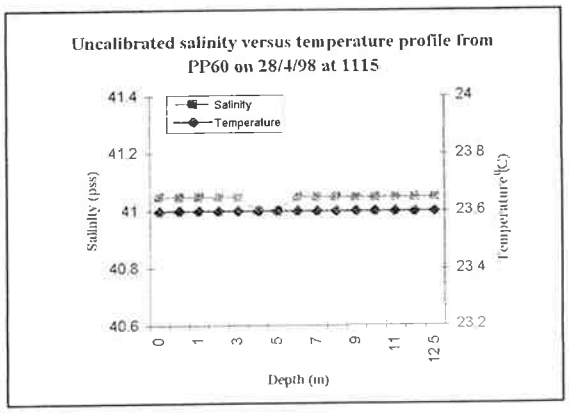


Figure 20 Salinity versus temperature profiles for PP60 from 5/3/98 to 5/5/98









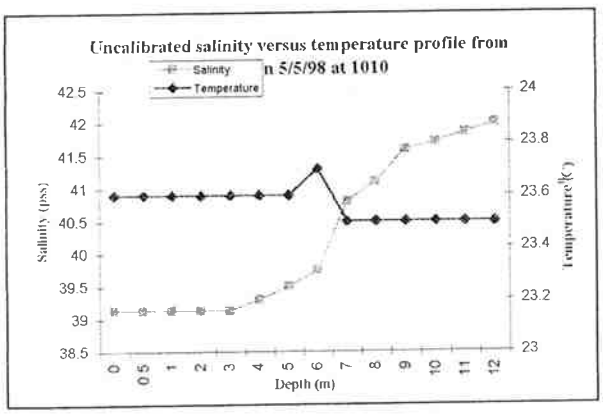
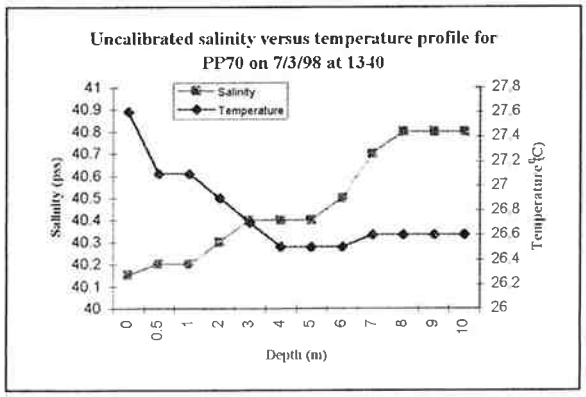
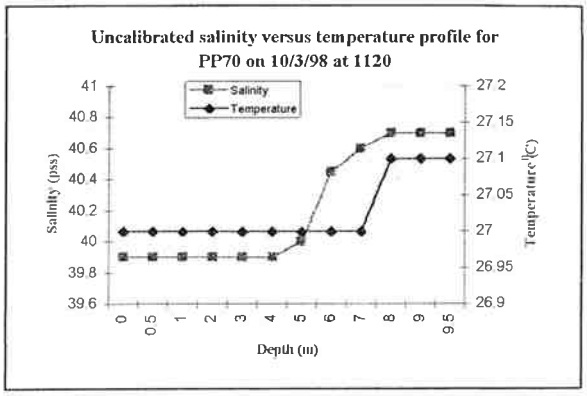
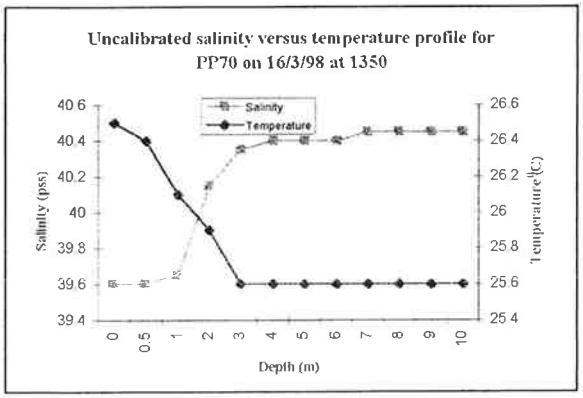
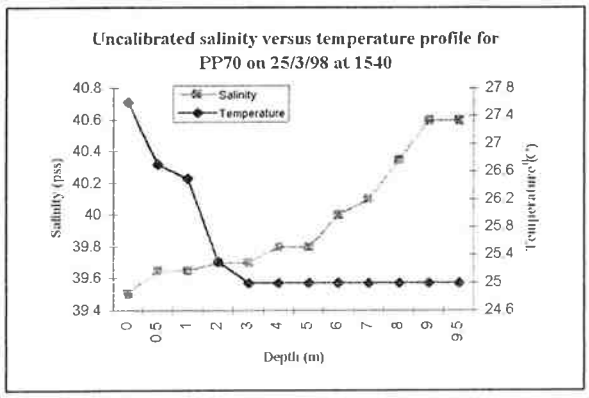


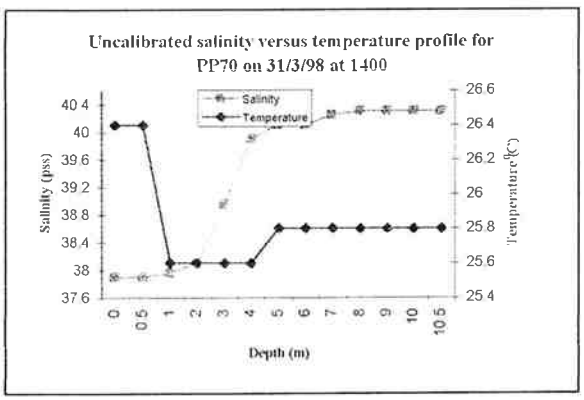
Figure 20 (continued)

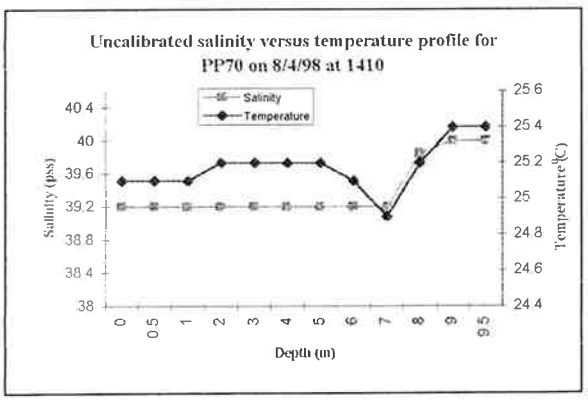


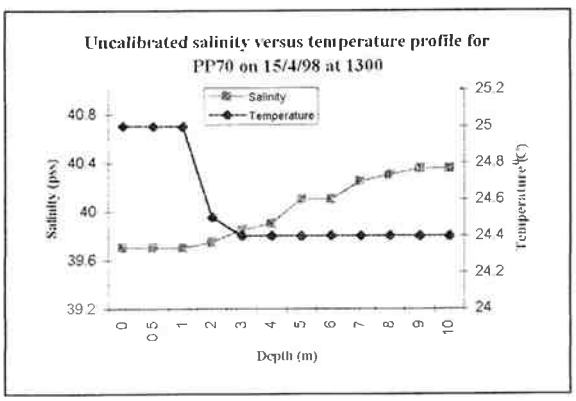












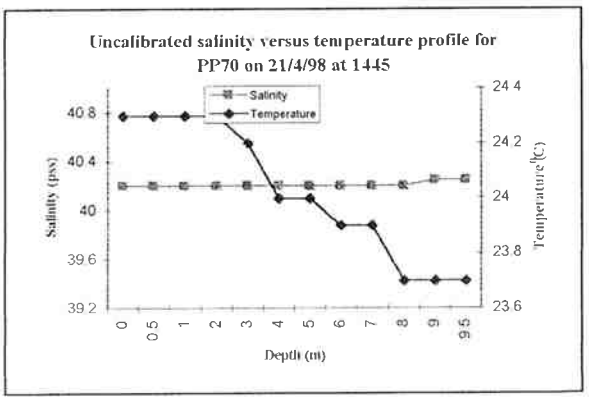
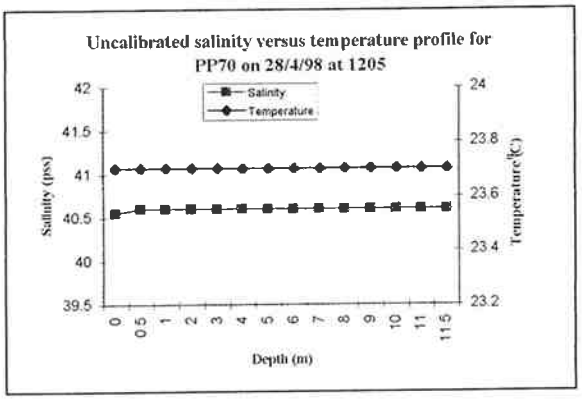


Figure 21 Salinity versus temperature profiles for PP70 from 7/3/98 to 5/5/98



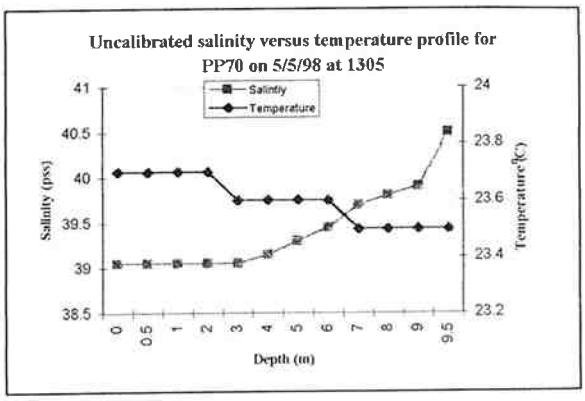
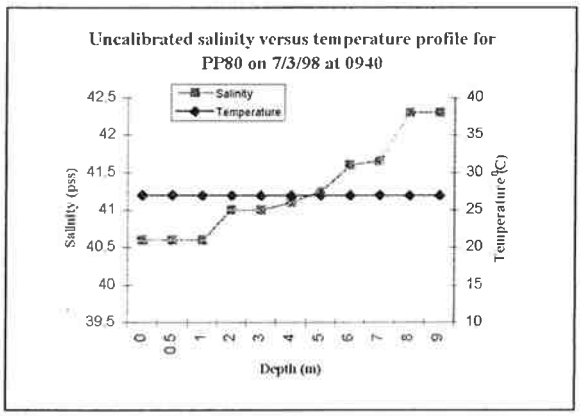
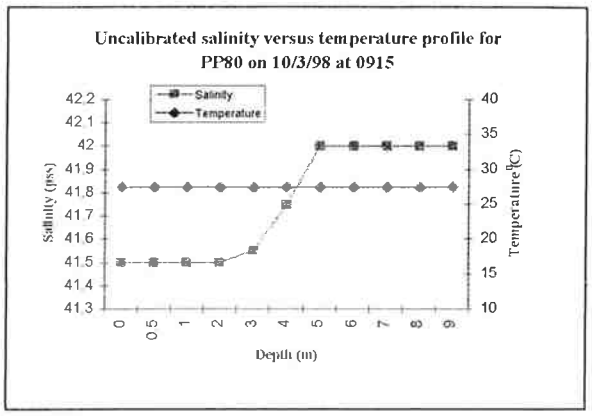
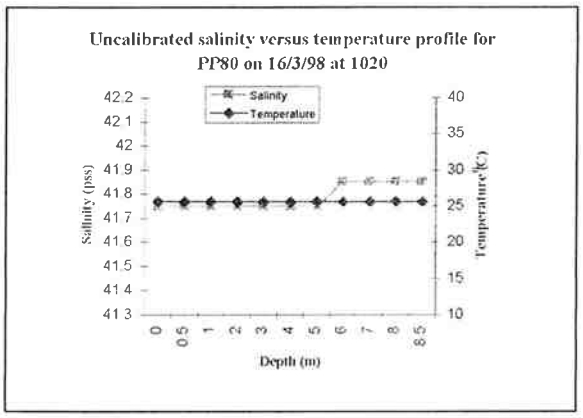
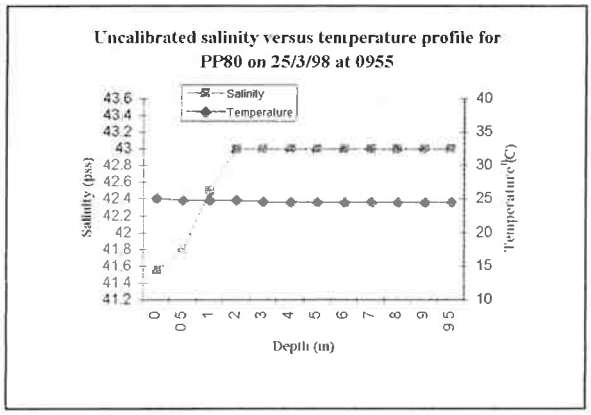


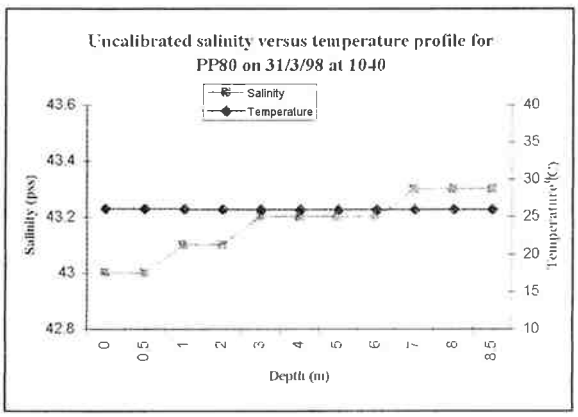
Figure 21 (continued)

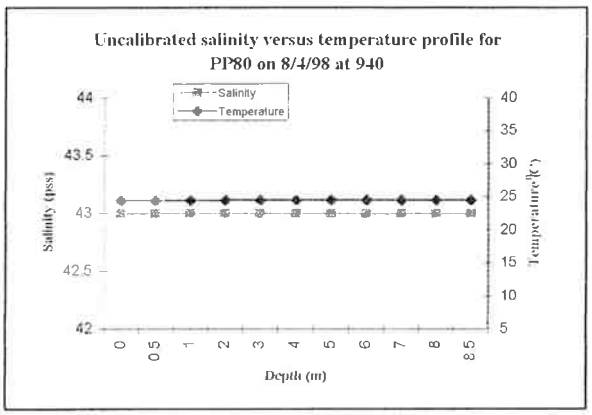


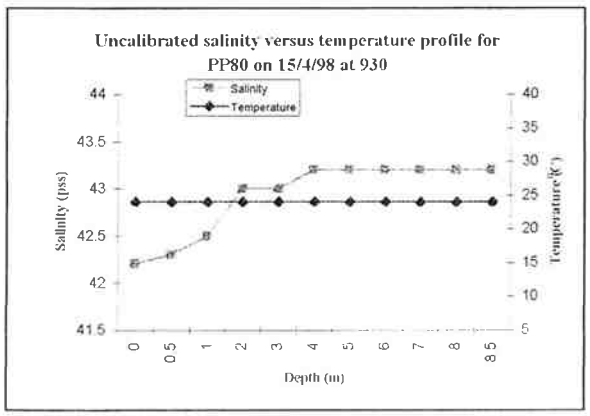












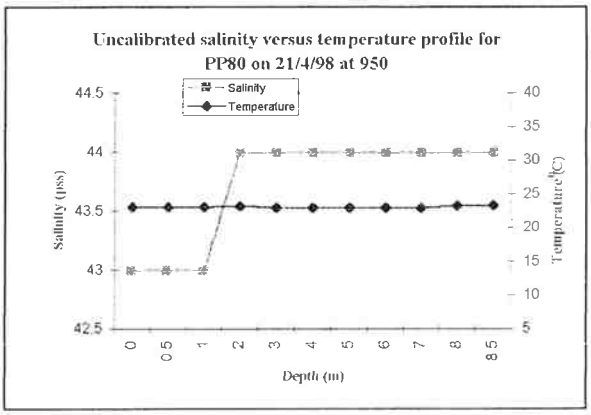
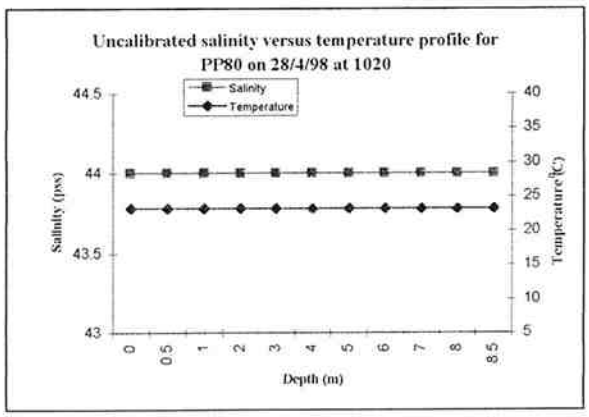


Figure 22 Salinity versus temperature profiles for PP80 from 7/3/98 to 5/5/98



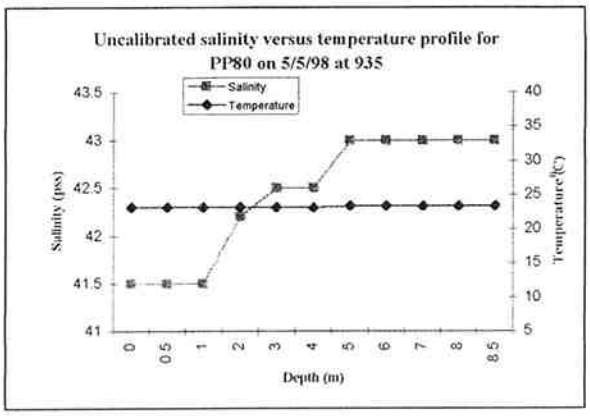
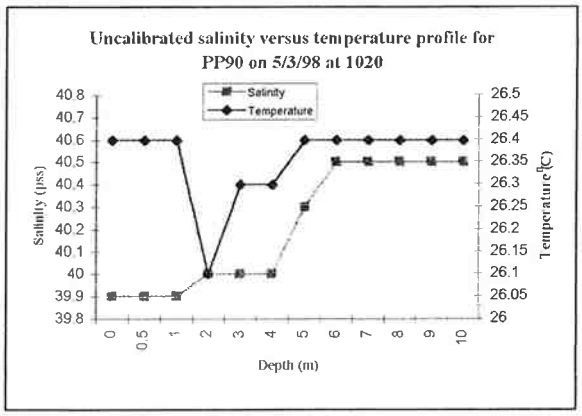
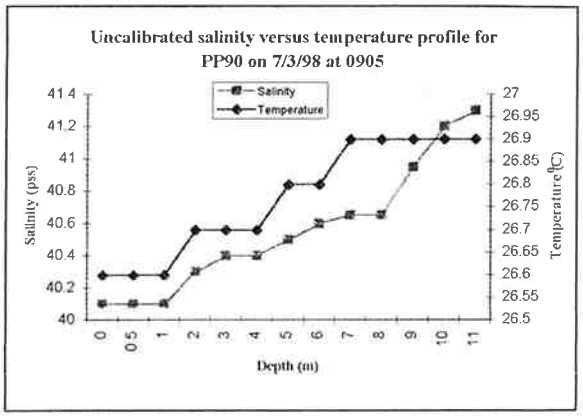
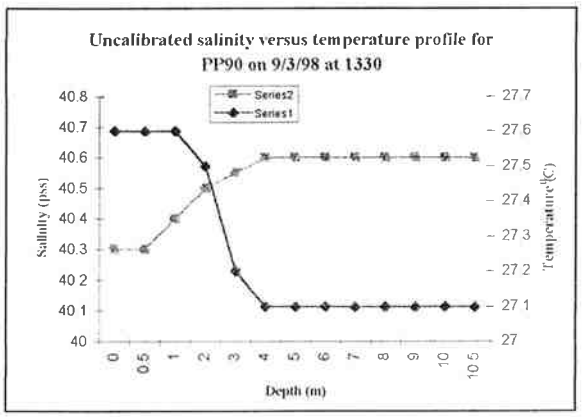
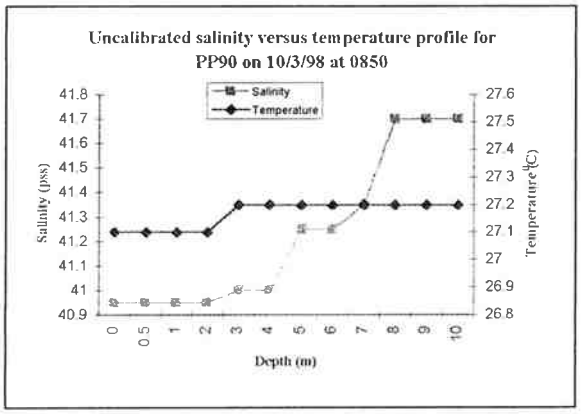


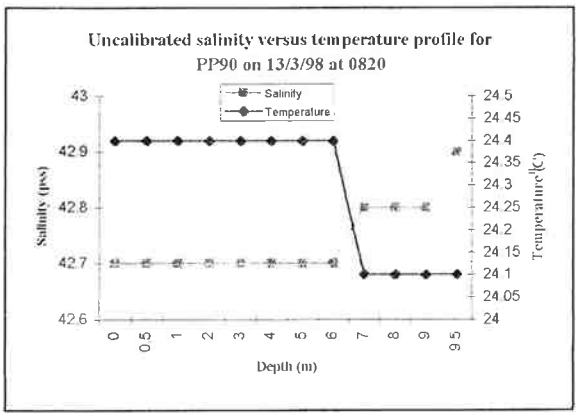
Figure 22 (continued)

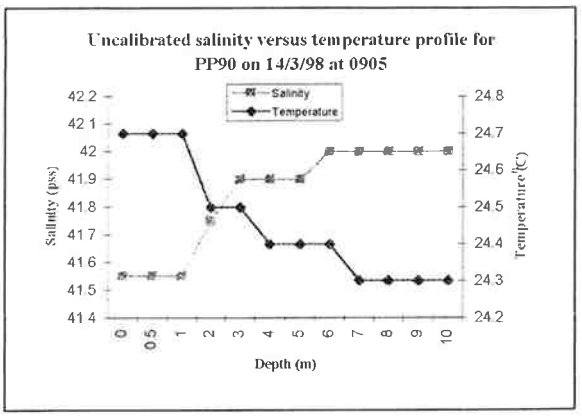


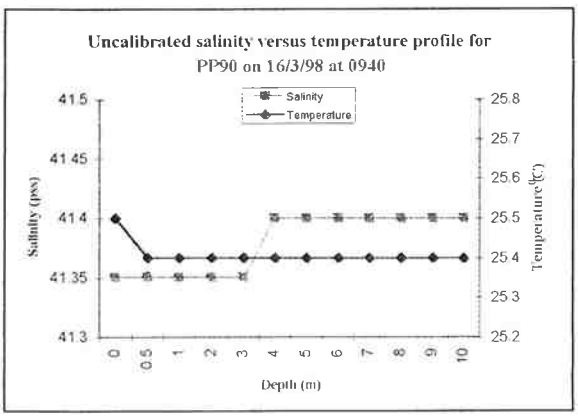












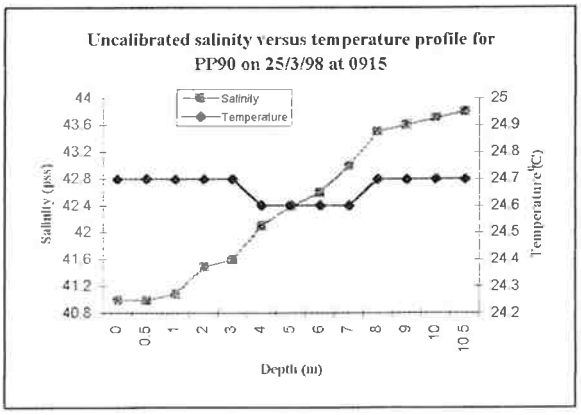
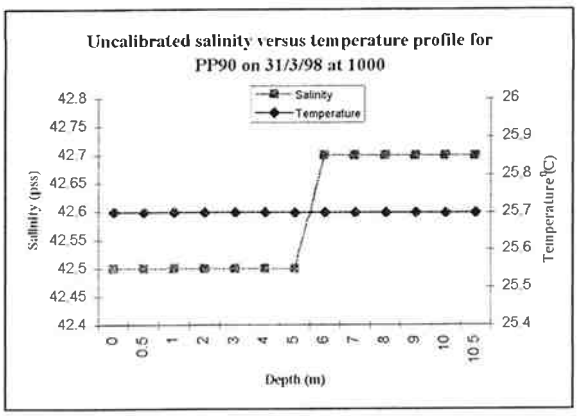
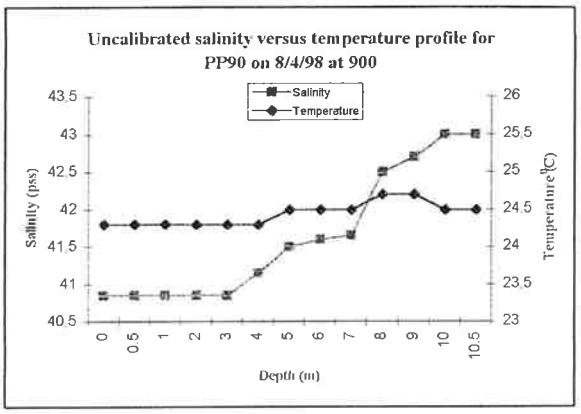
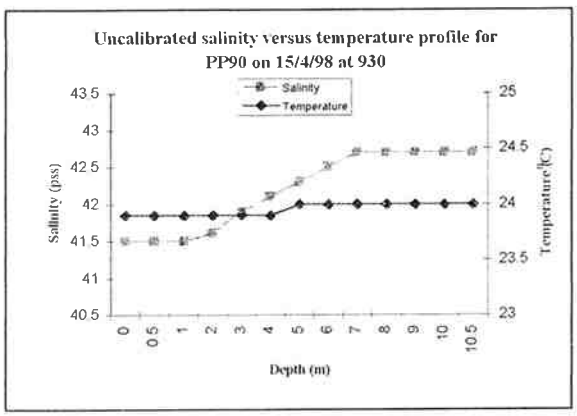
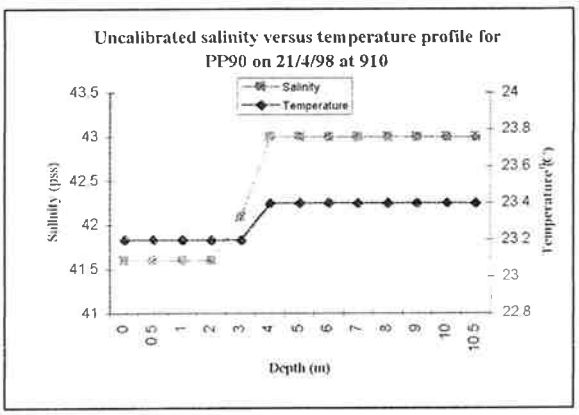


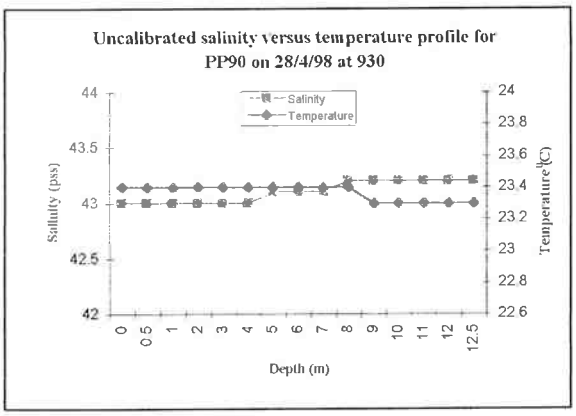
Figure 23 Salinity versus temperature profiles for PP90 from 5/3/98 to 5/5/98











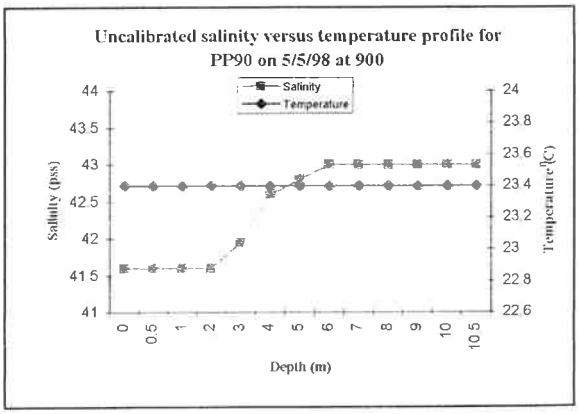
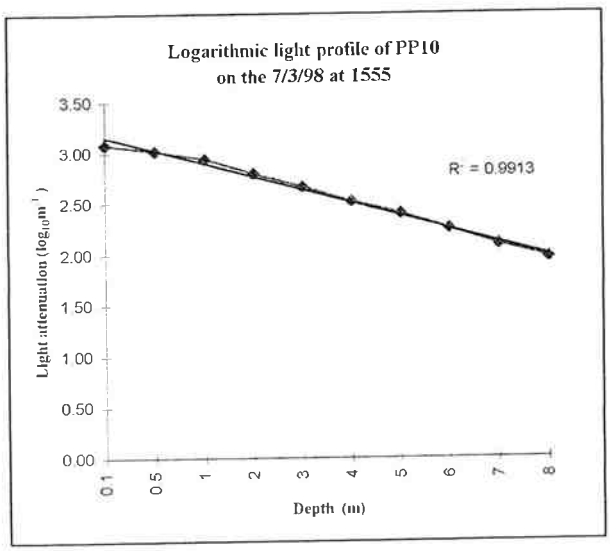
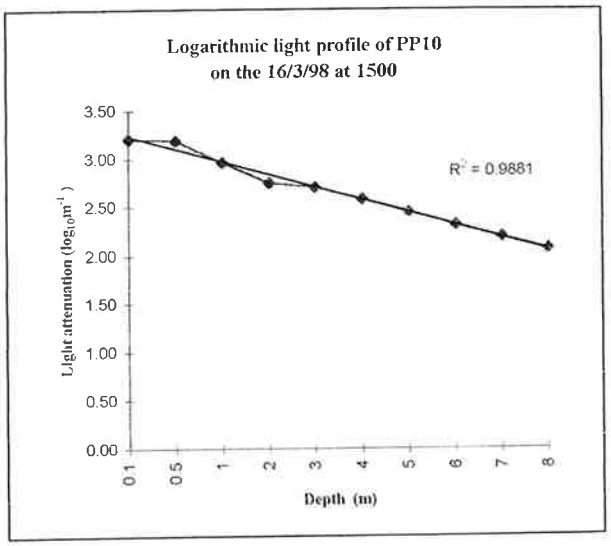
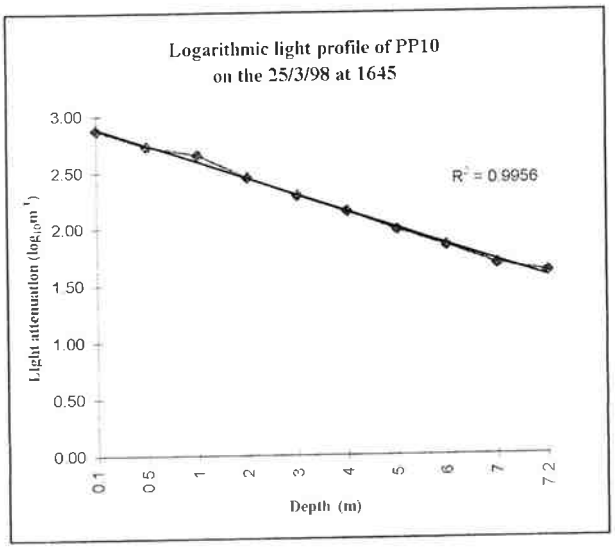


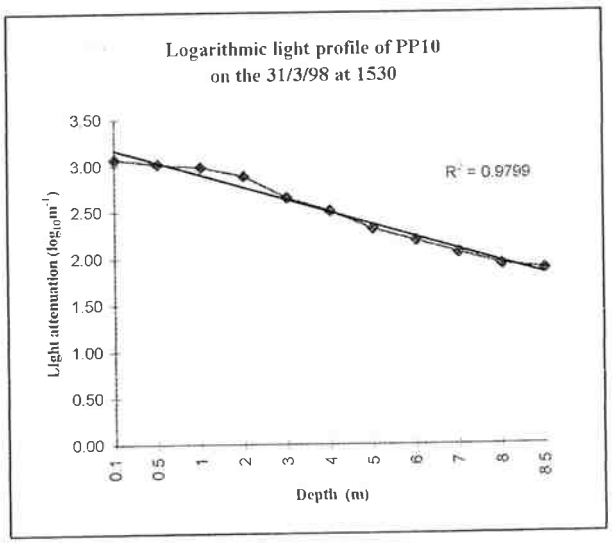
Figure 23 (continued)

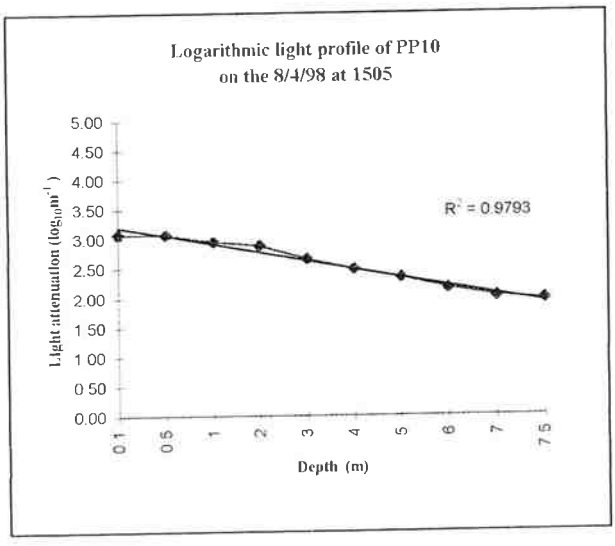
Light curves











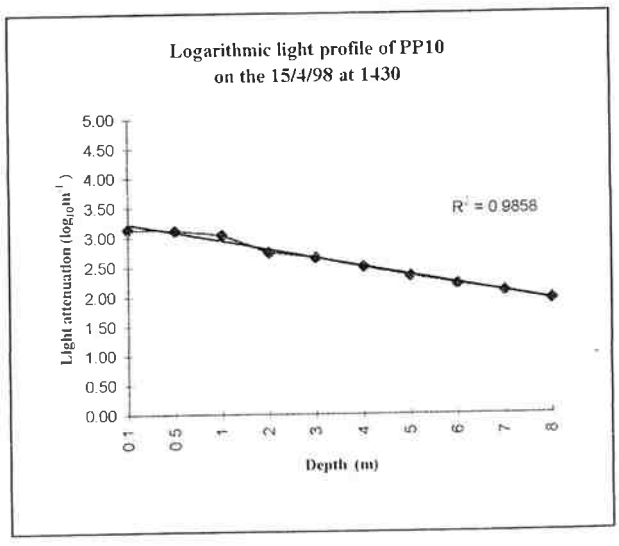
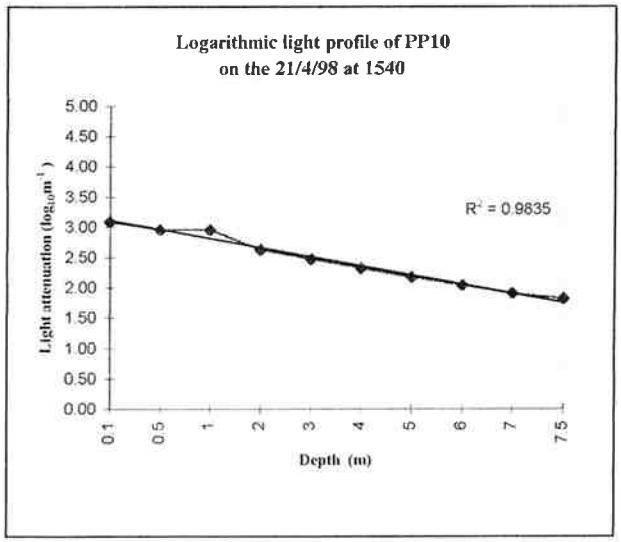
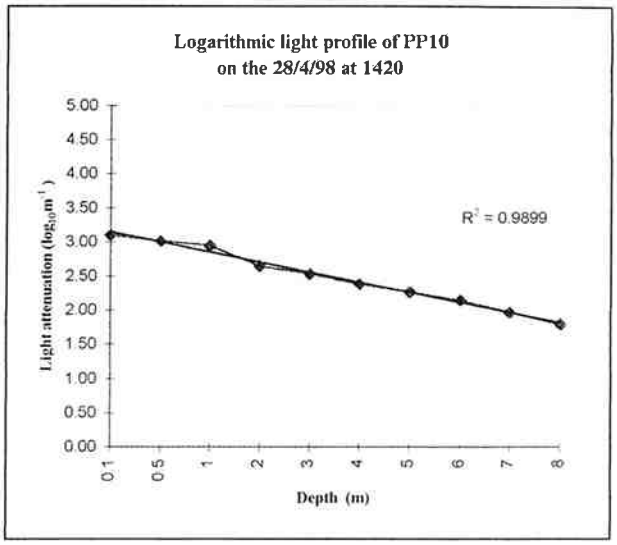


Figure 24 Logarithmic light profiles for sample site PP10 from 7/3/98 to 5/5/98





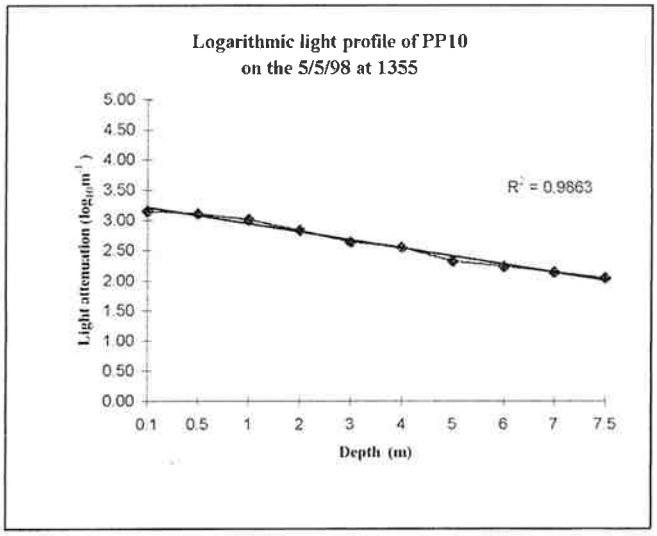
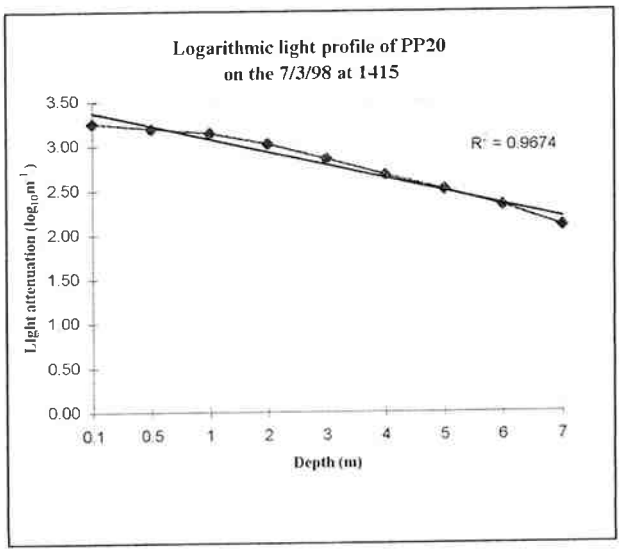
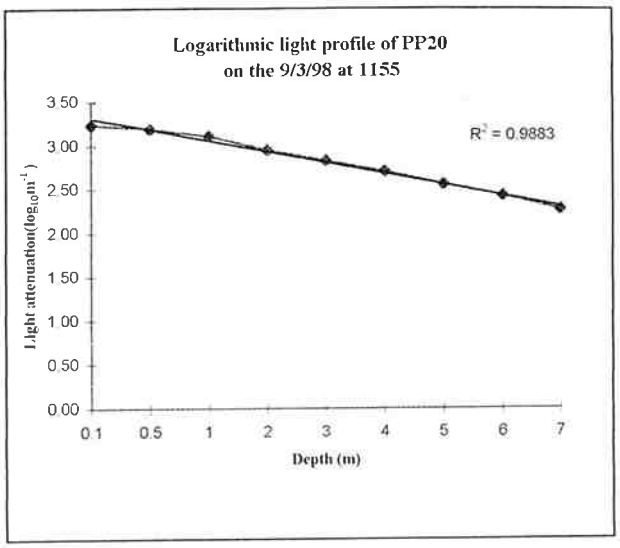
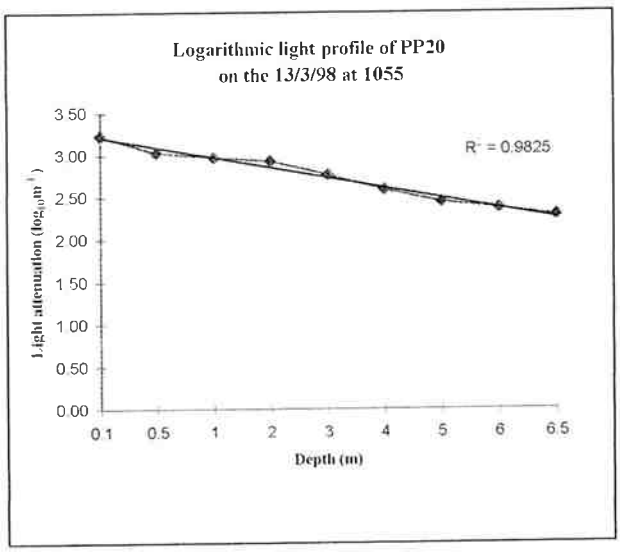
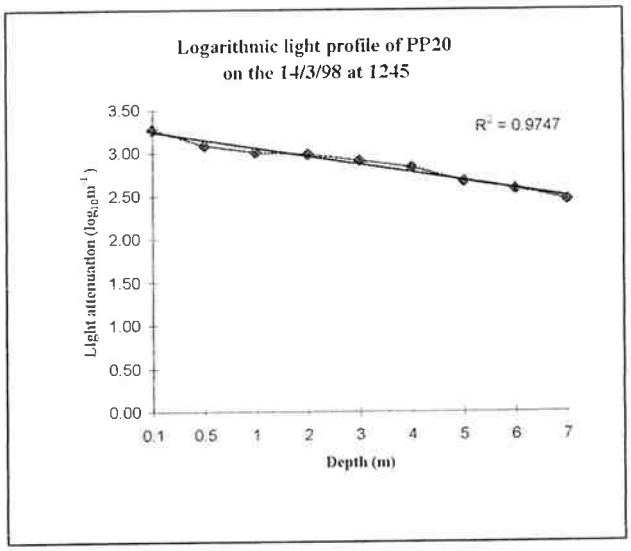


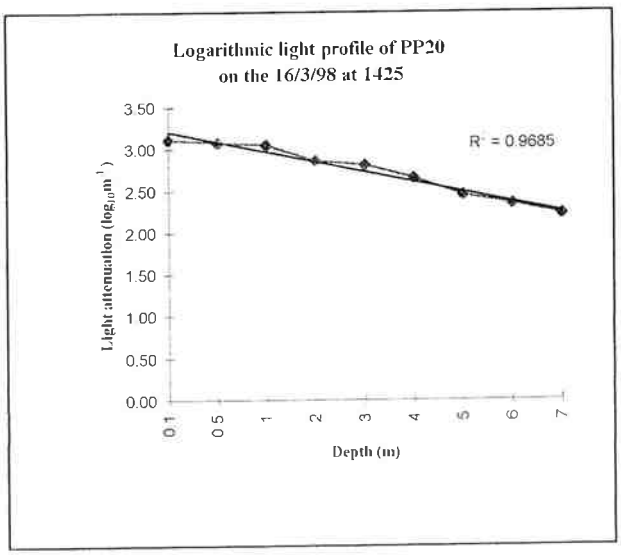
Figure 24 (continued)











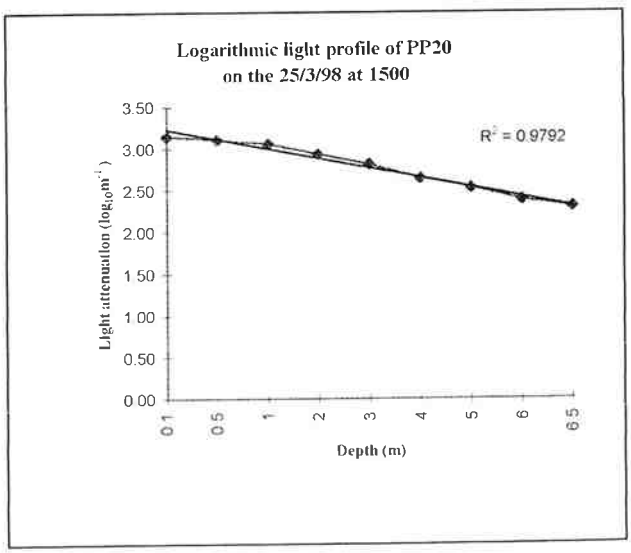
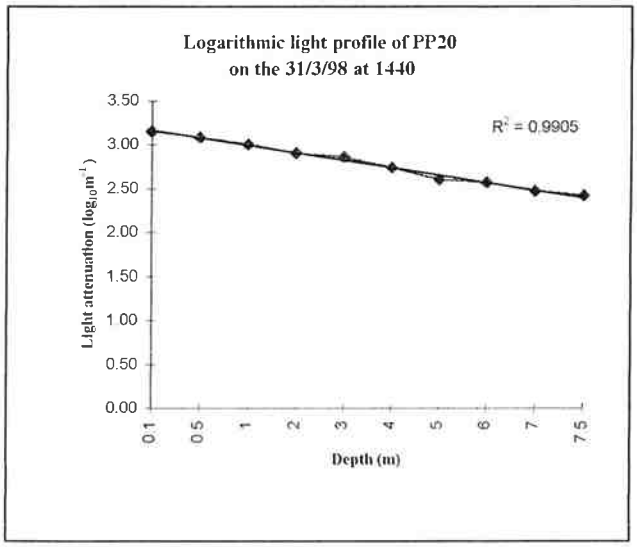
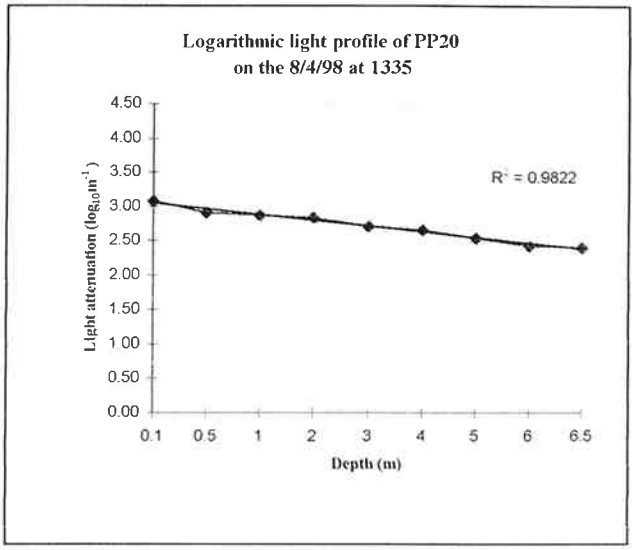
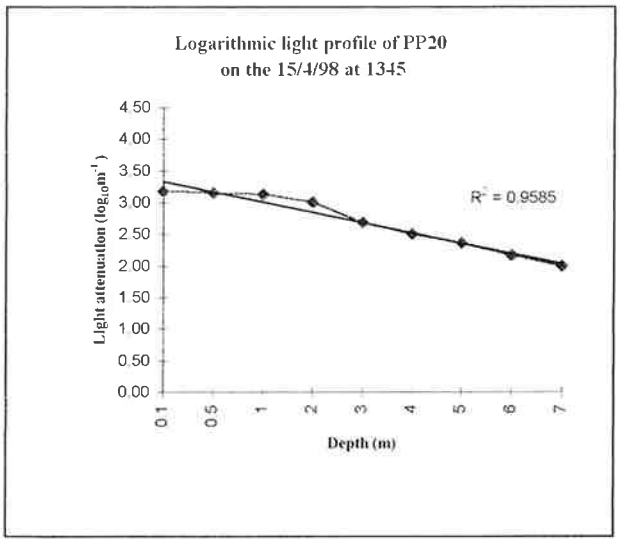
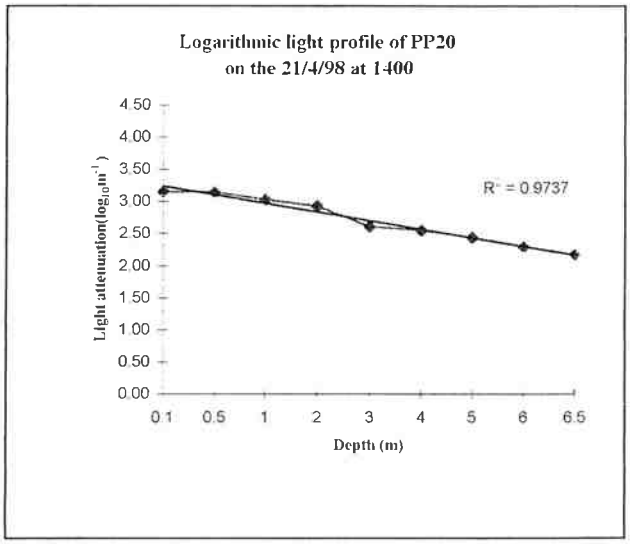


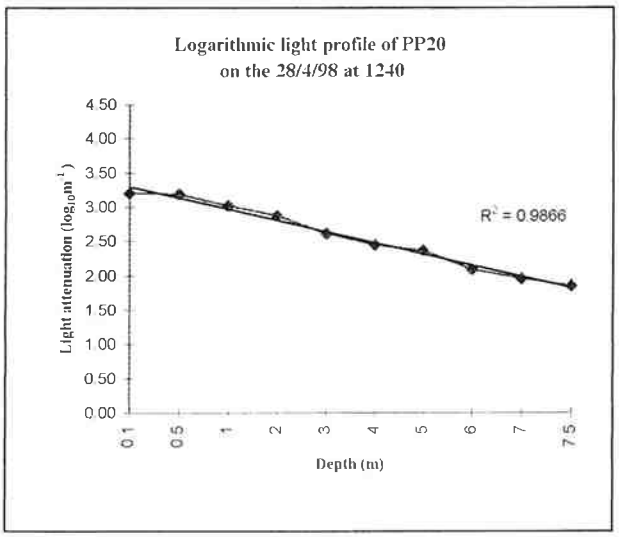
Figure 25 Logarithmic light profiles for sample site PP20 from 7/3/98 to 5/5/98











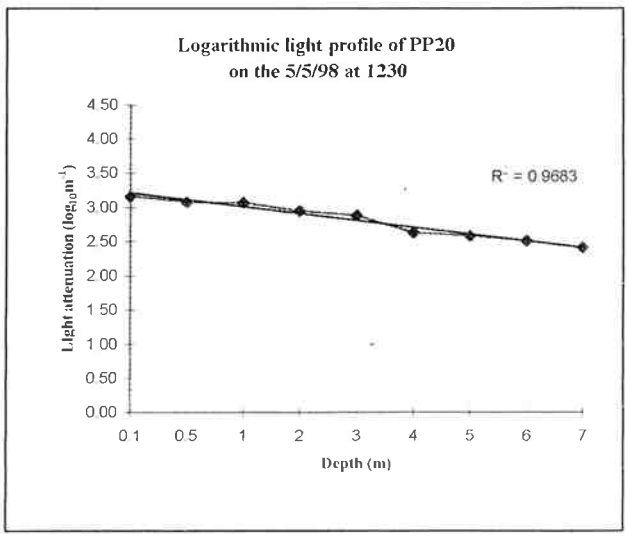
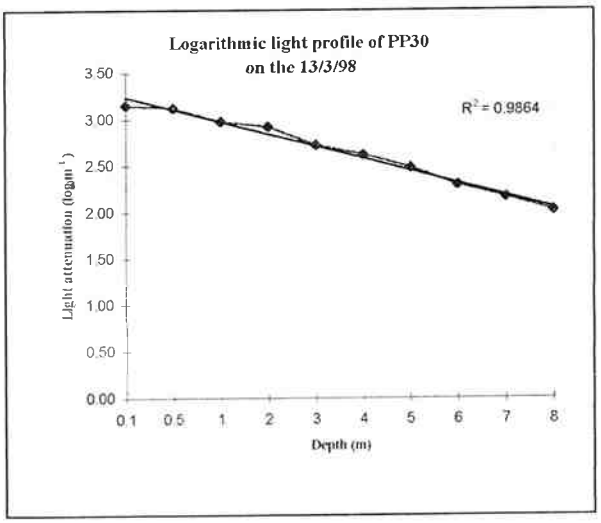
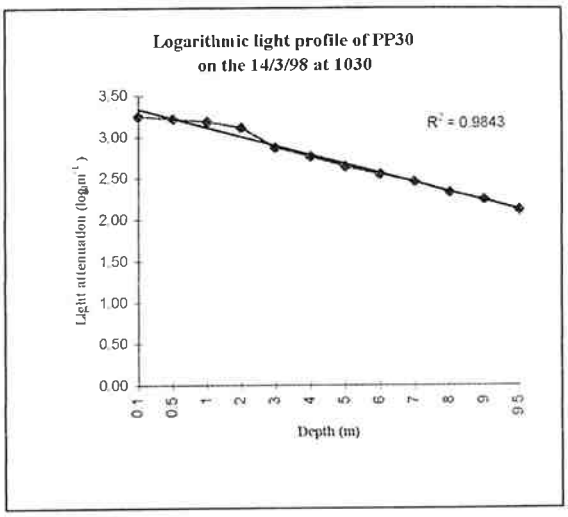
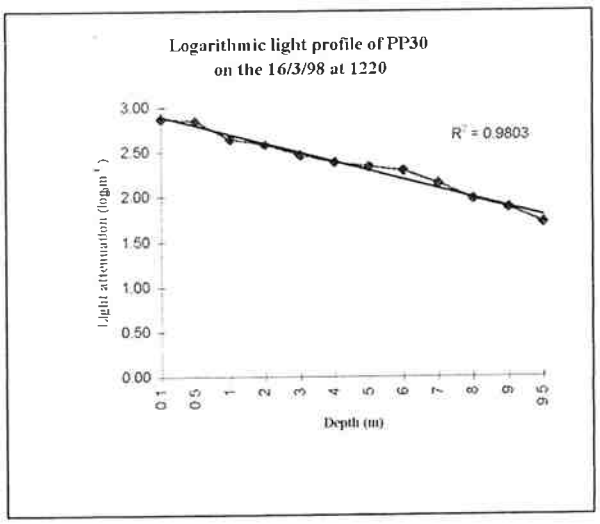
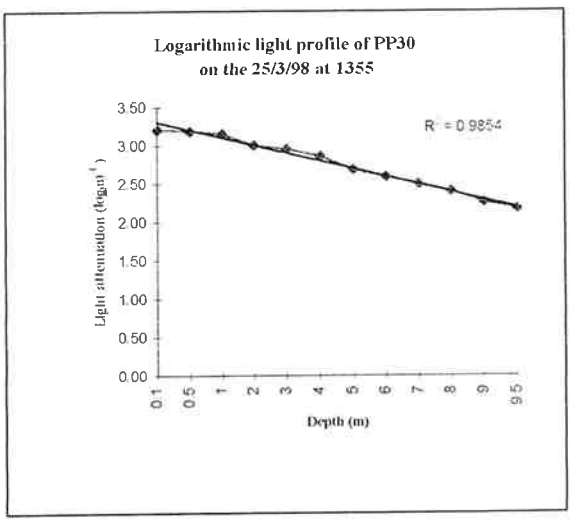


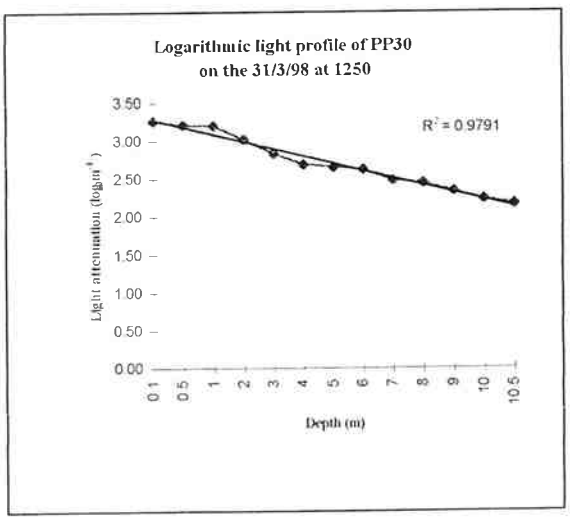
Figure 25 (continued)











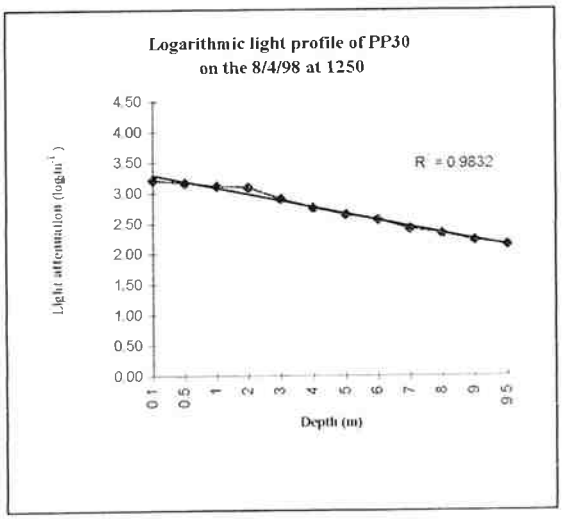
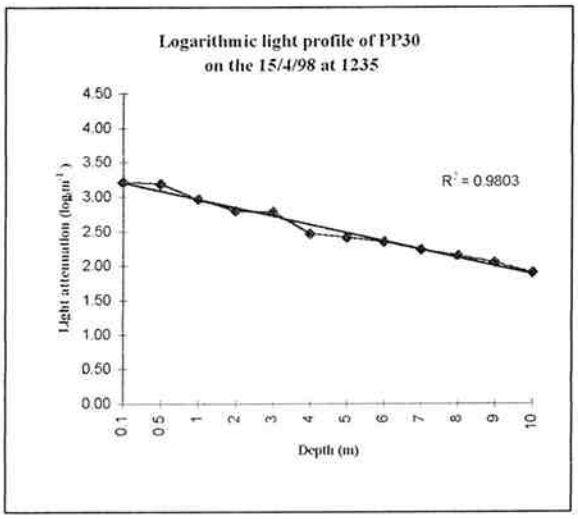
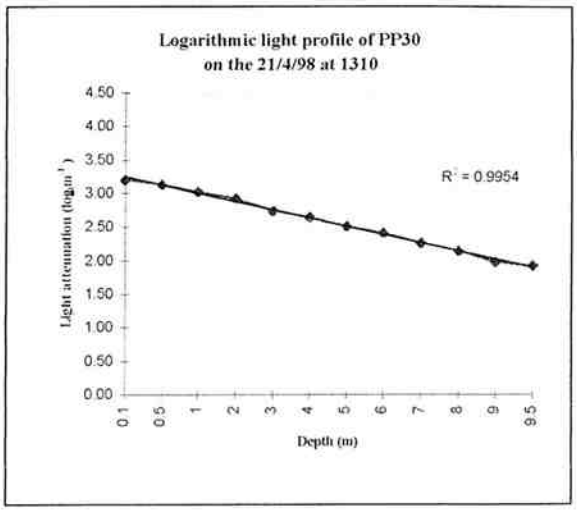
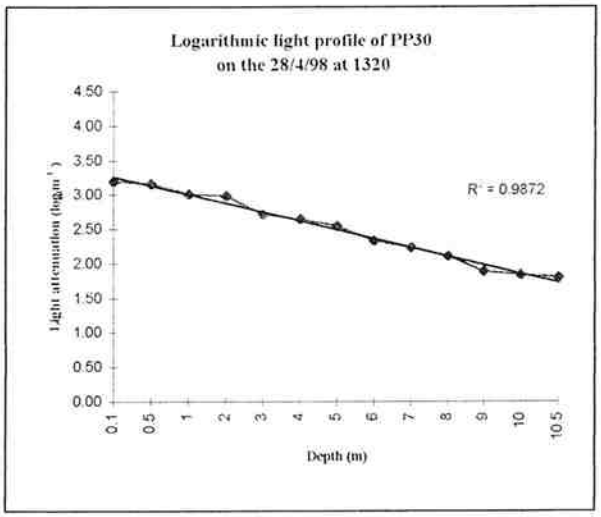


Figure 26 Logarithmic light profiles for sample site PP30 from 13/3/98 to 5/5/98







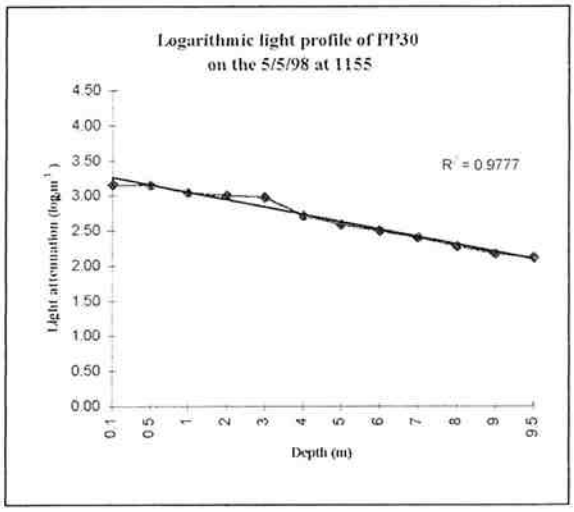
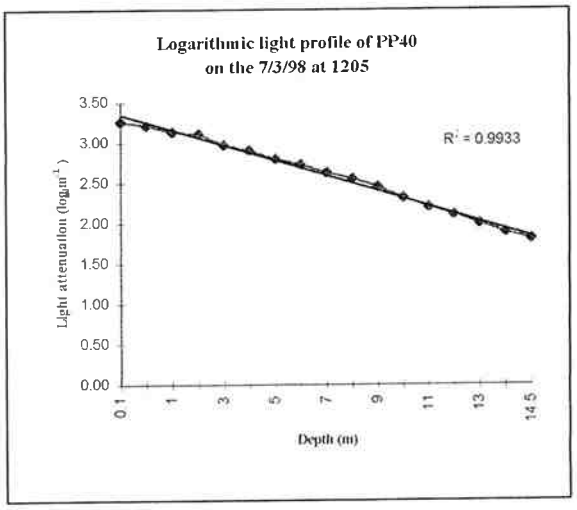
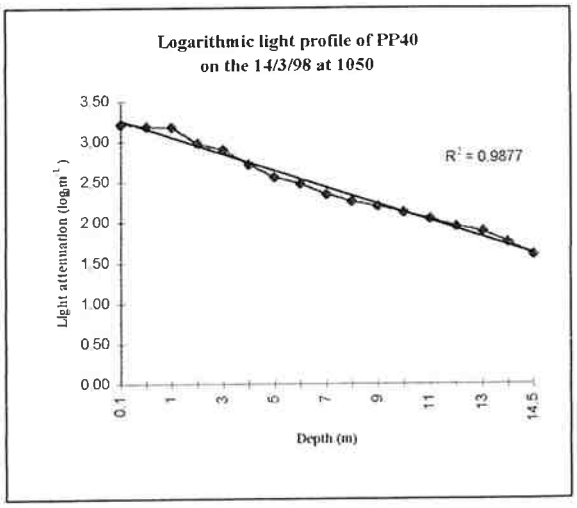
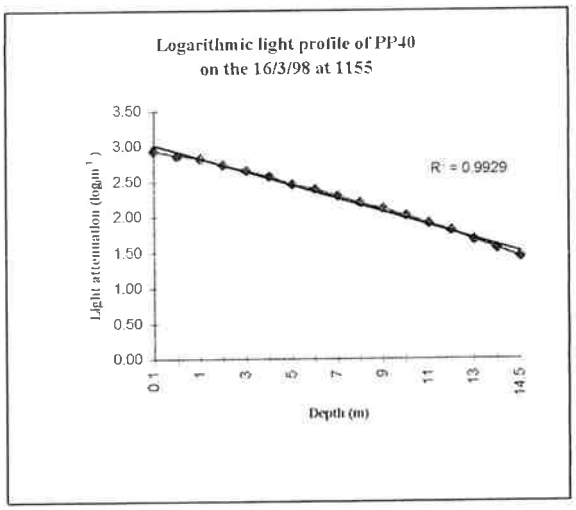
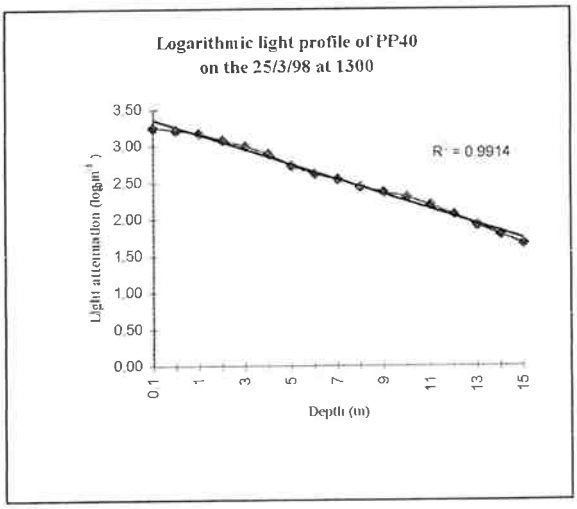


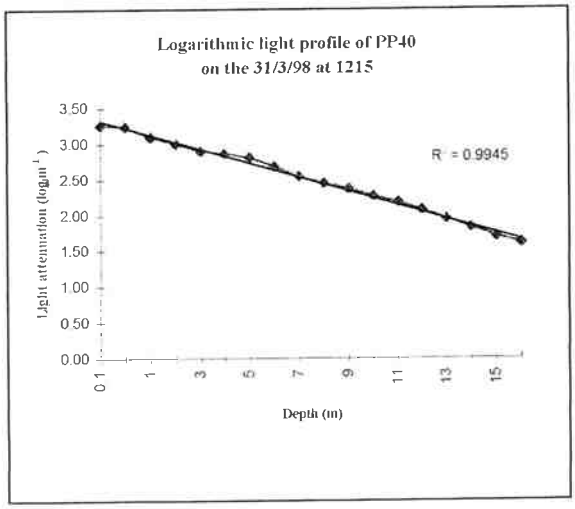
Figure 26 (continued)











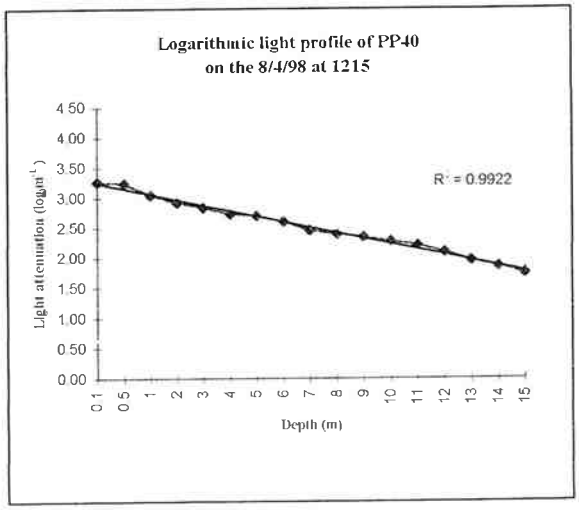
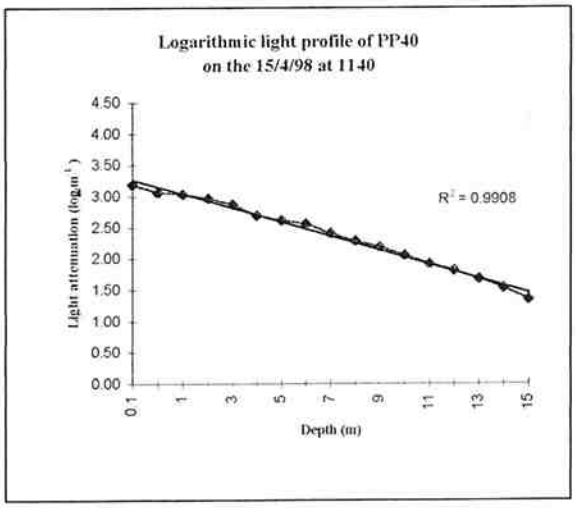
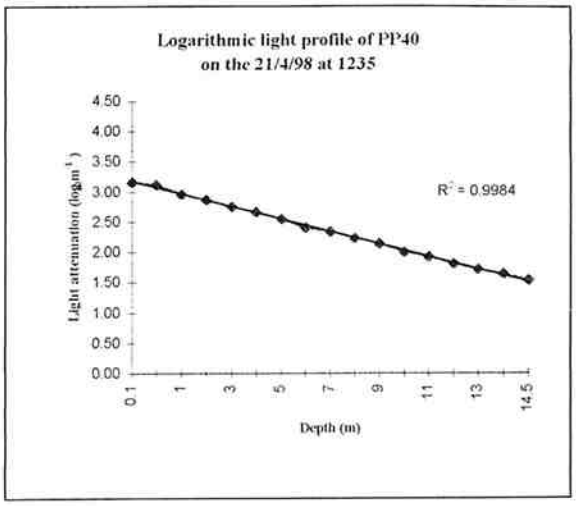


Figure 27 Logarithmic light profiles for sample site PP40 from 7/3/98 to 5/5/98





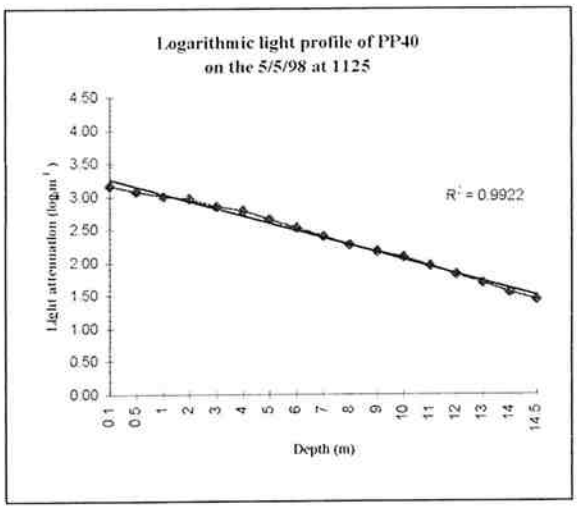
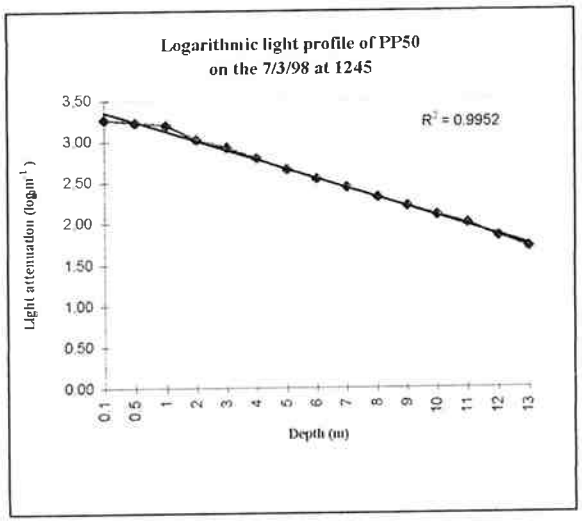
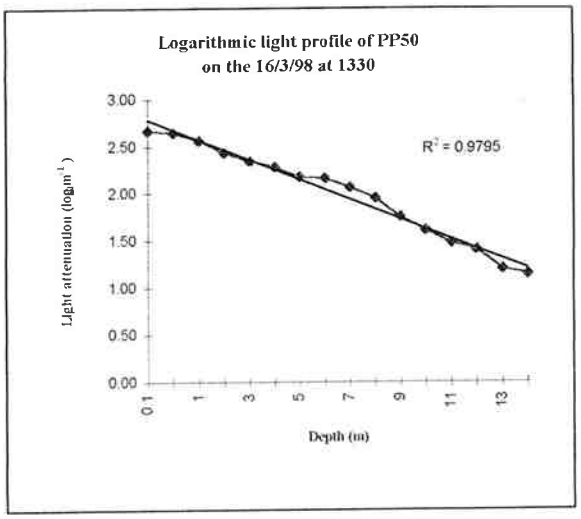
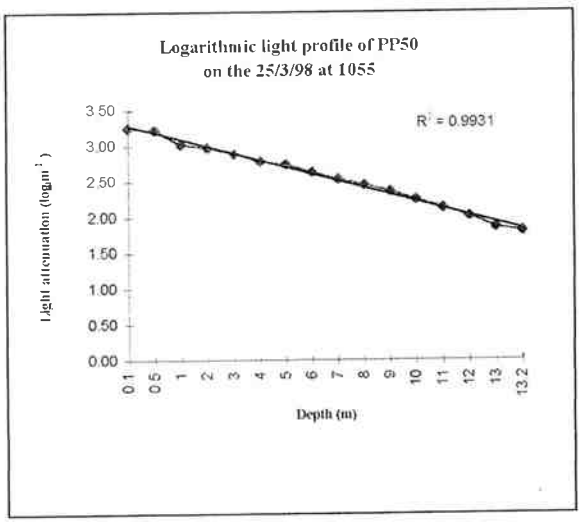
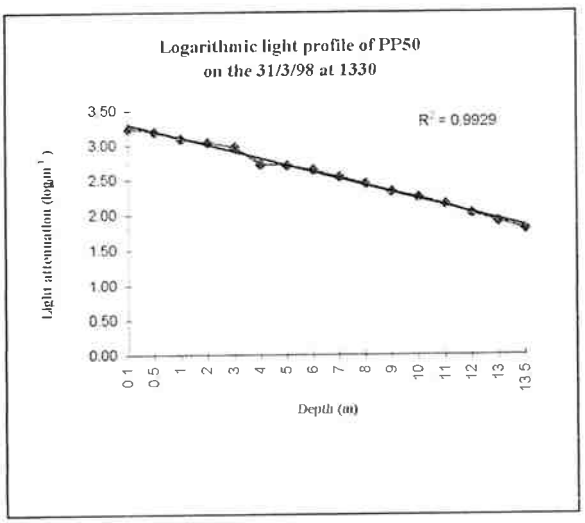


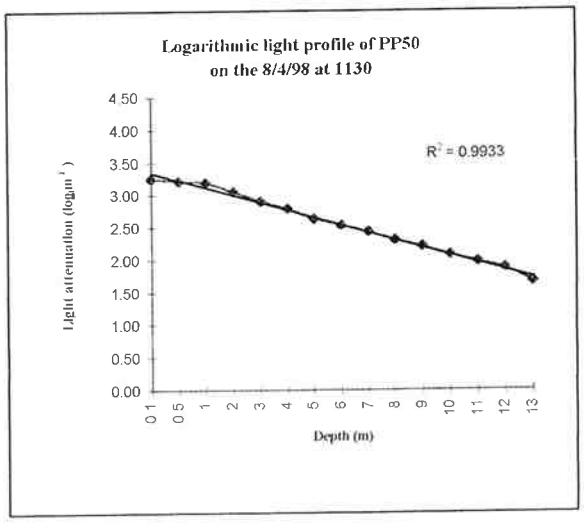
Figure 27 (continued)











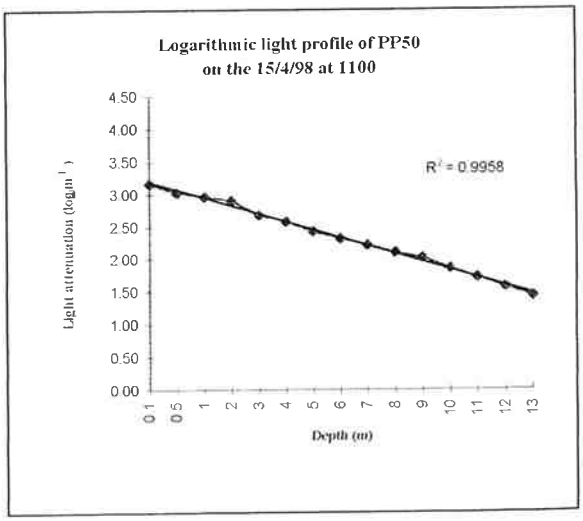
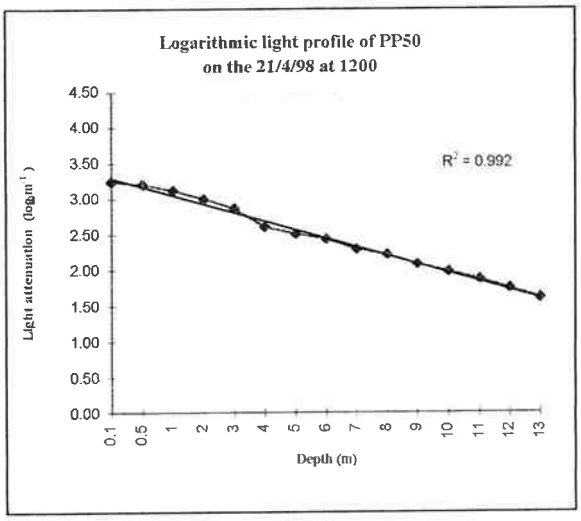


Figure 28 Logarithmic light profiles for sample site PP50 from 7/3/98 to 5/5/98



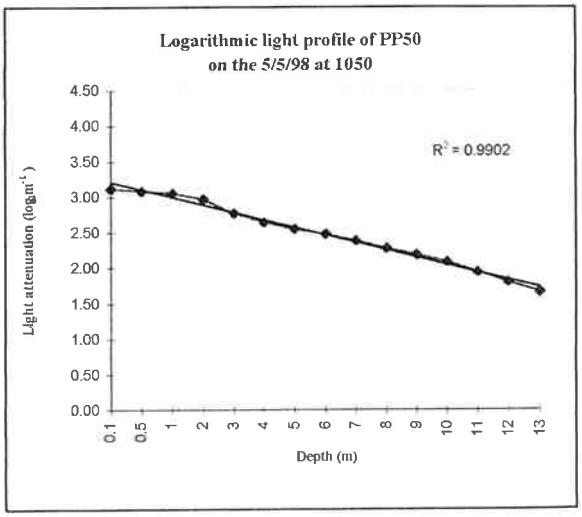
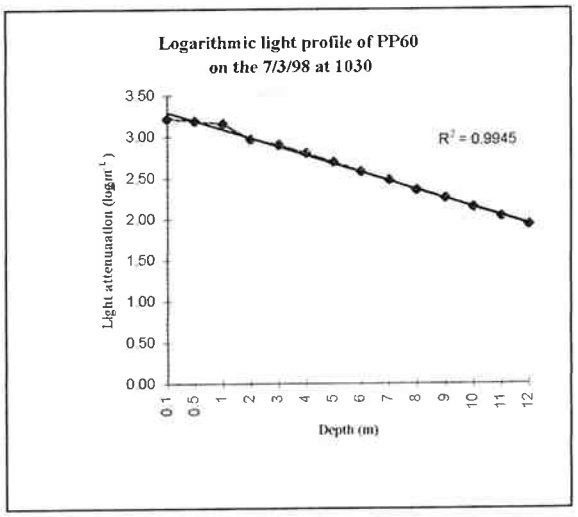
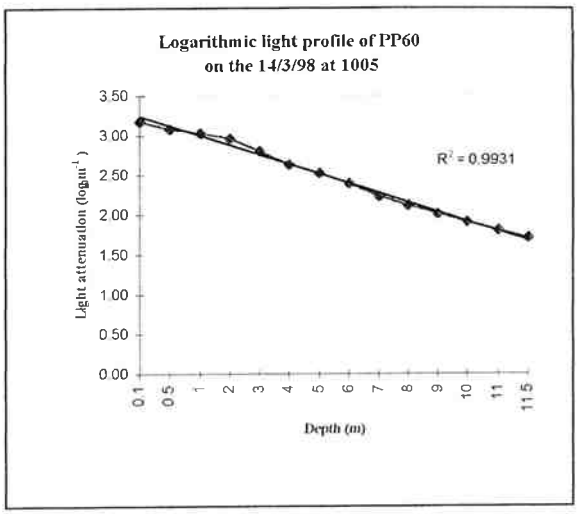
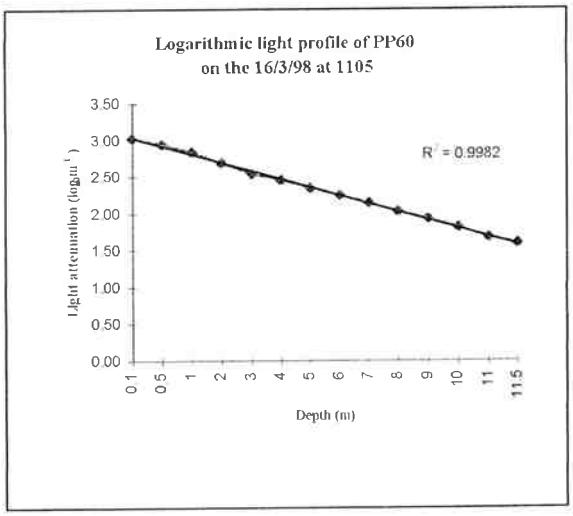
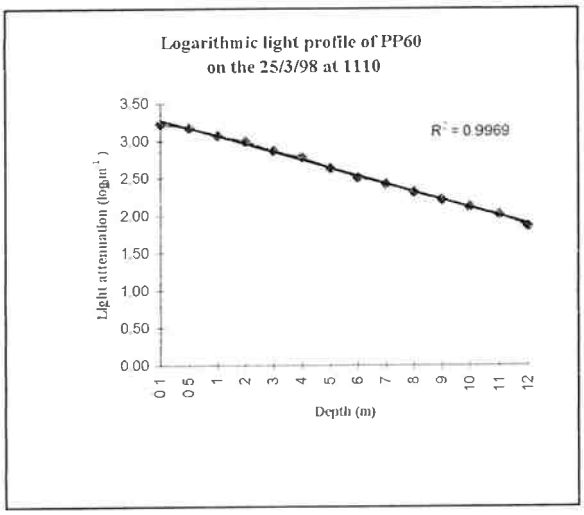


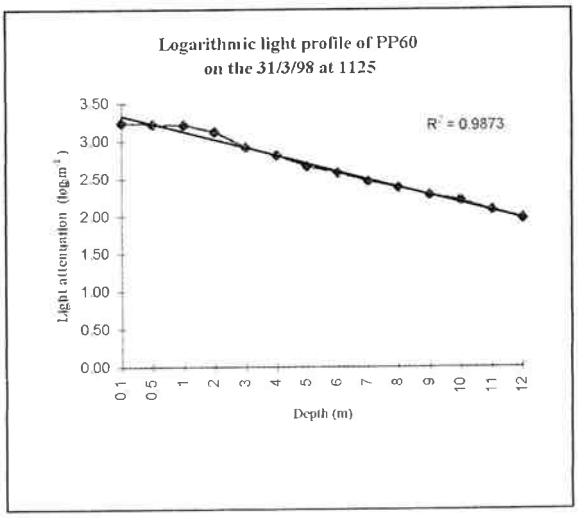
Figure 28 (continued)











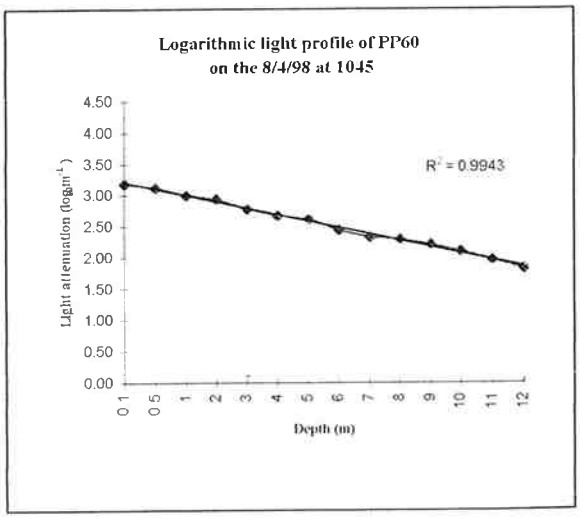
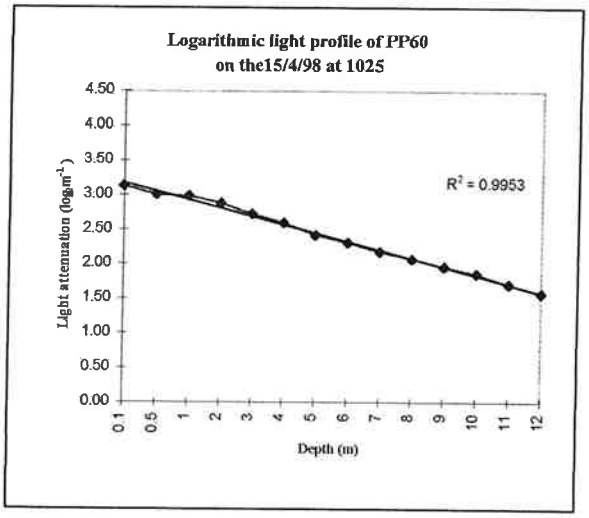
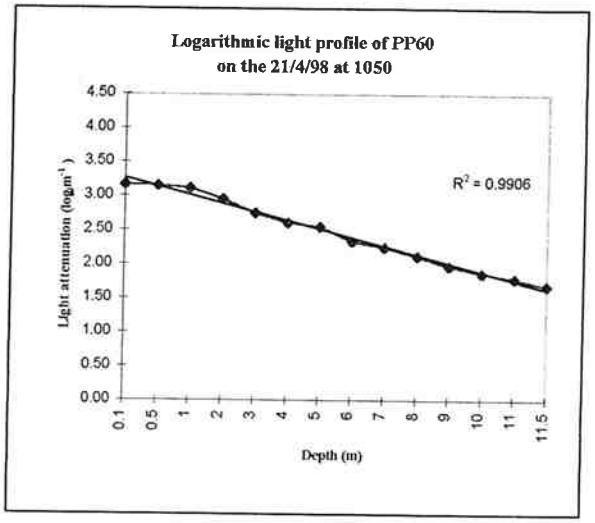
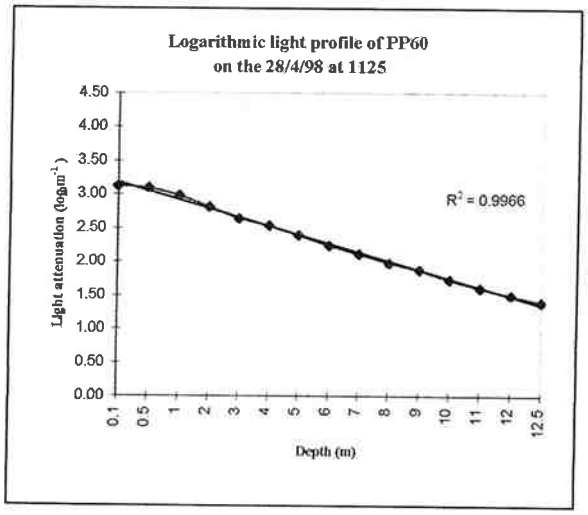


Figure 29 Logarithmic light profiles for sample site PP60 from 7/3/98 to 5/5/98







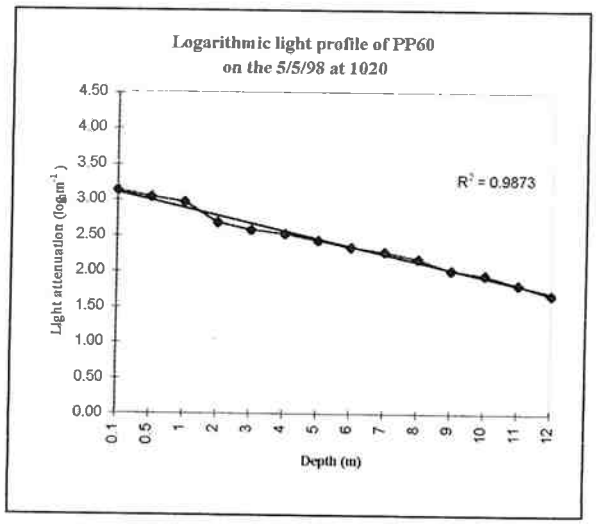
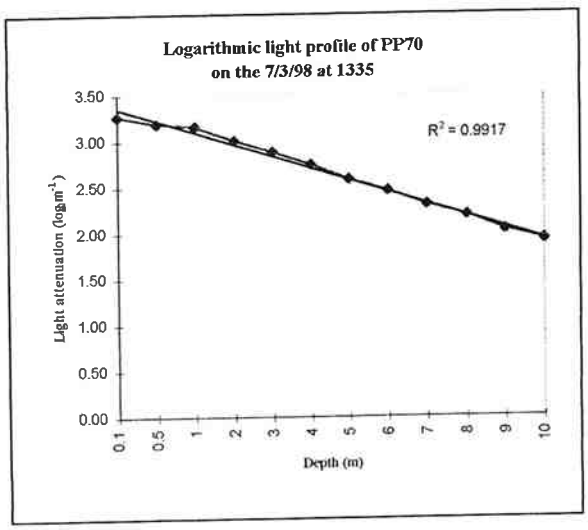
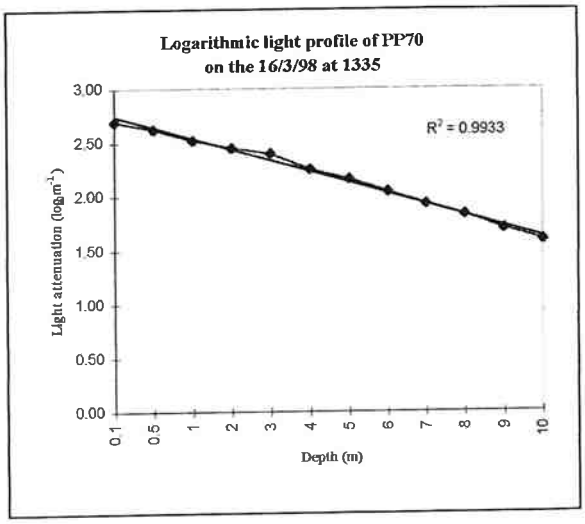
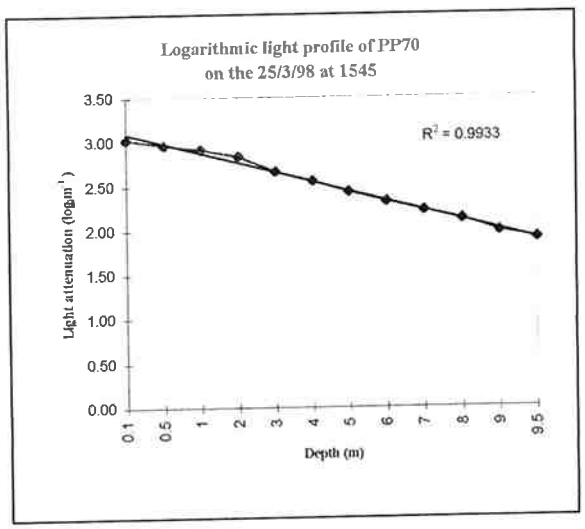
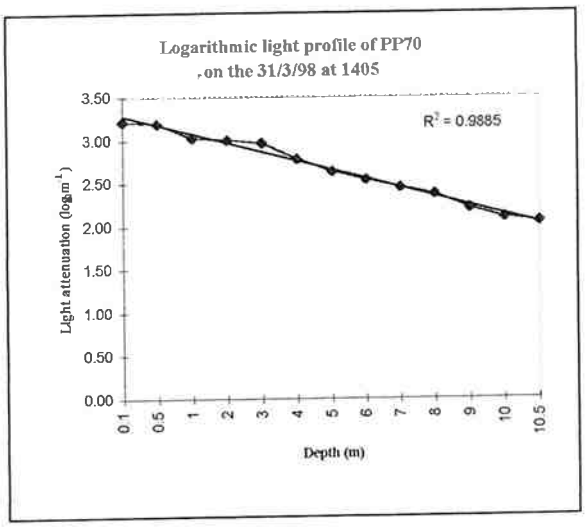


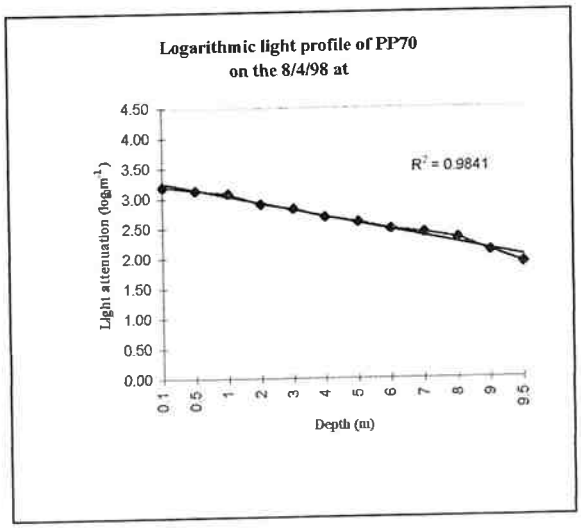
Figure 29 (continued)











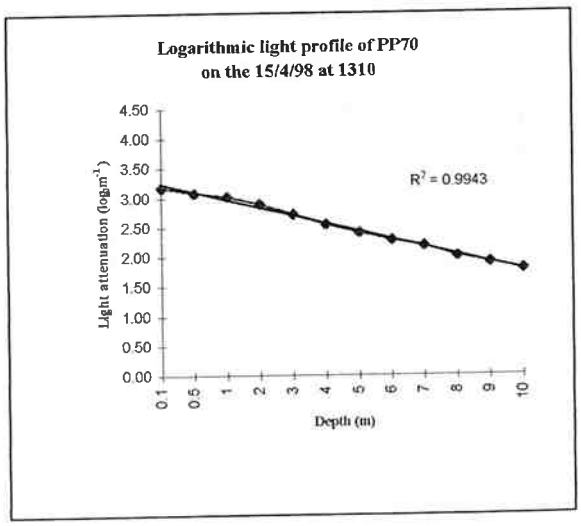
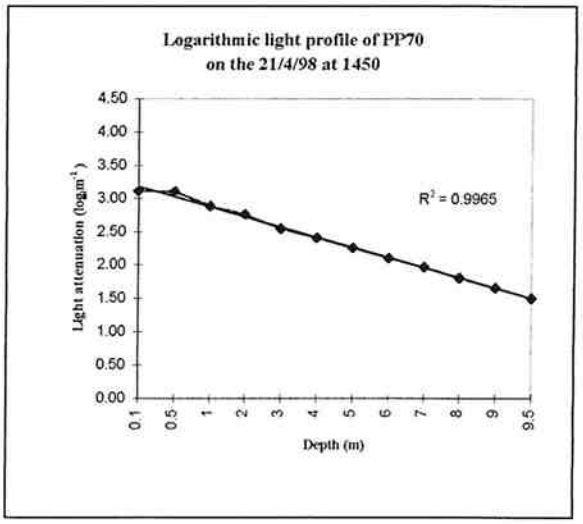
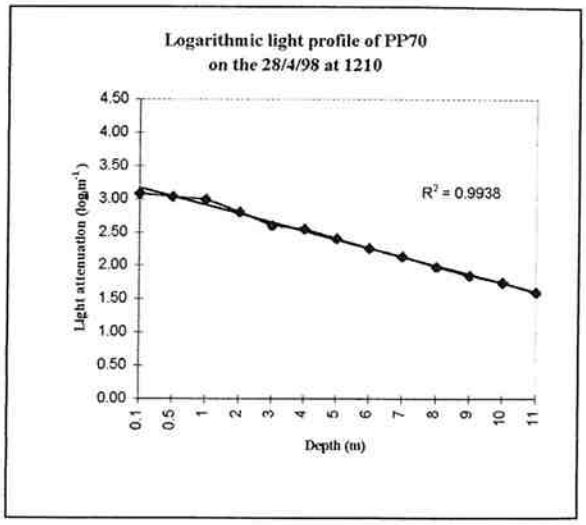


Figure 30 Logarithmic light profiles for sample site PP70 from 7/3/98 to 5/5/98





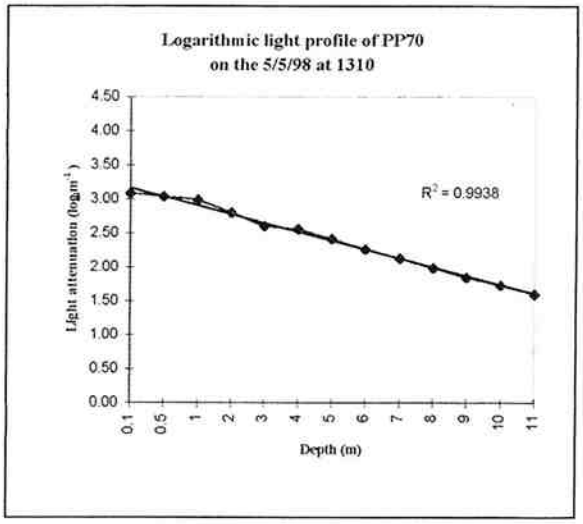
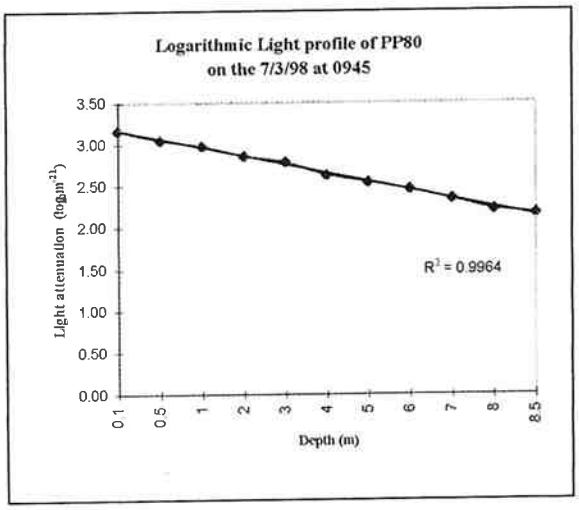
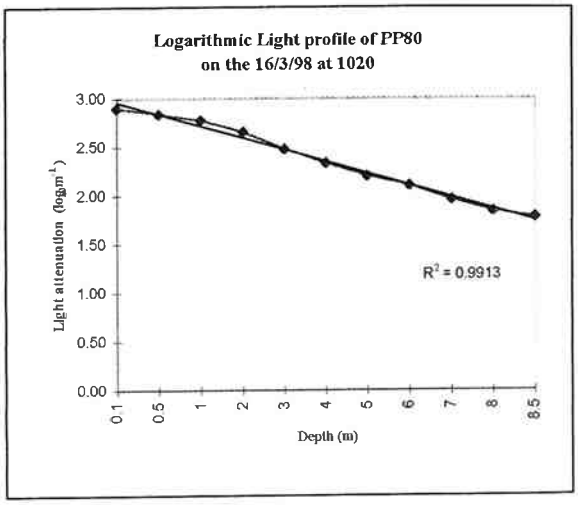
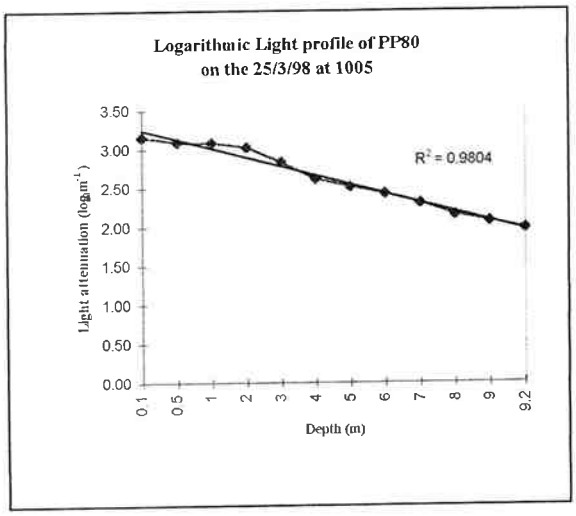
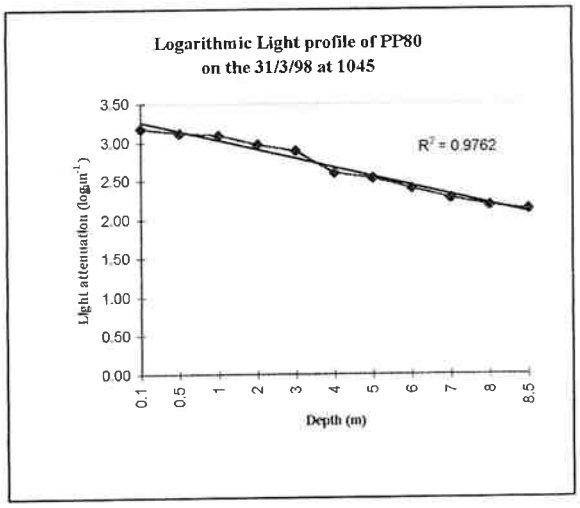


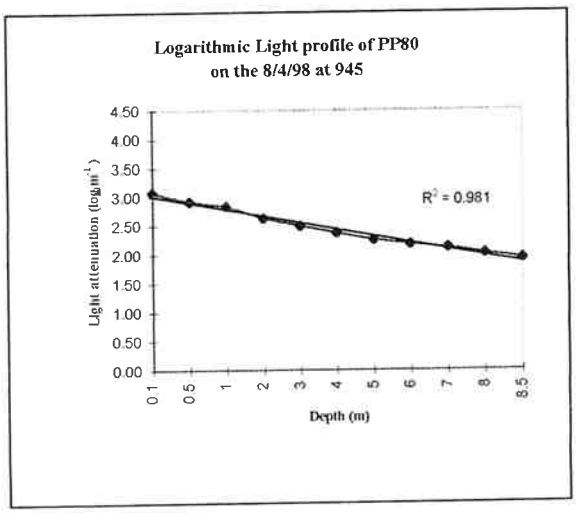
Figure 30 (continued)











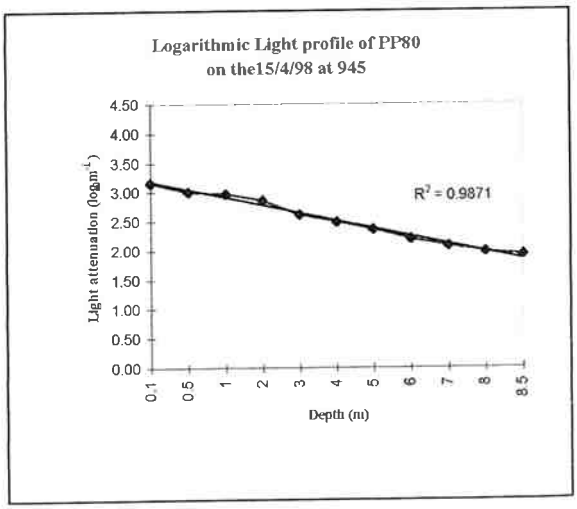
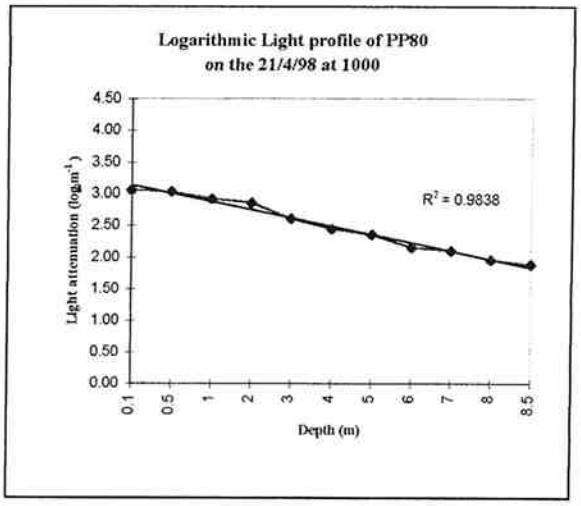
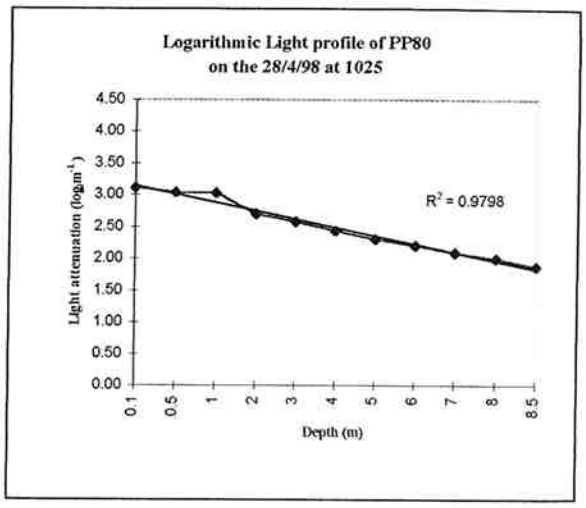


Figure 31 Logarithmic light profiles for sample site PP80 from 7/3/98 to 5/5/98





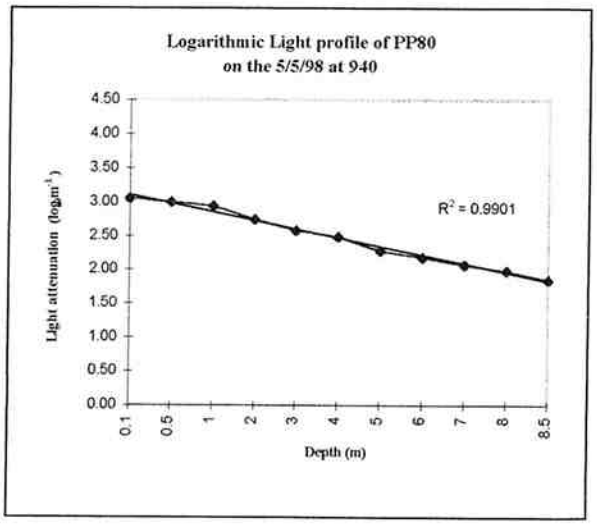
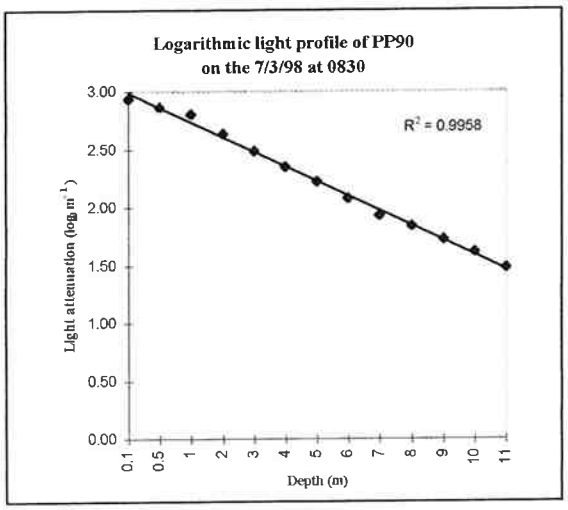
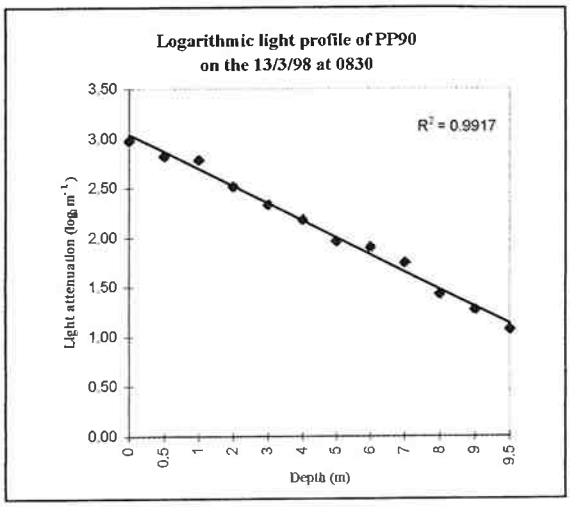
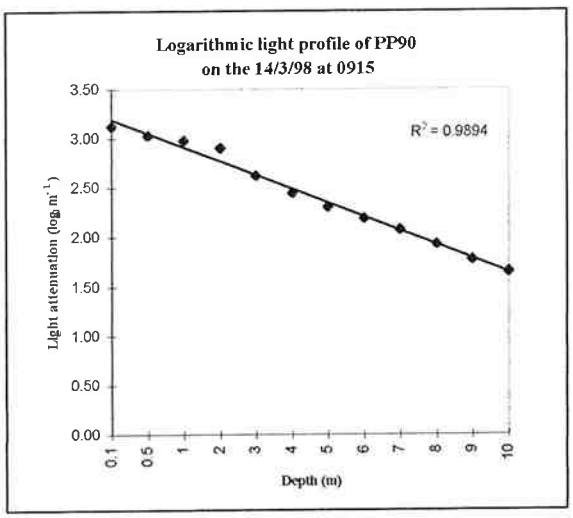
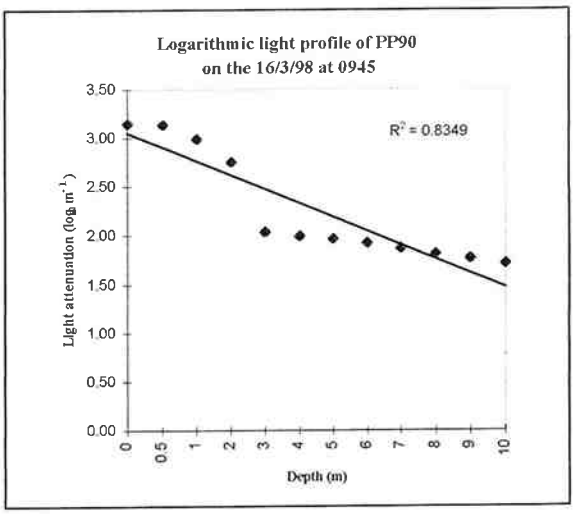


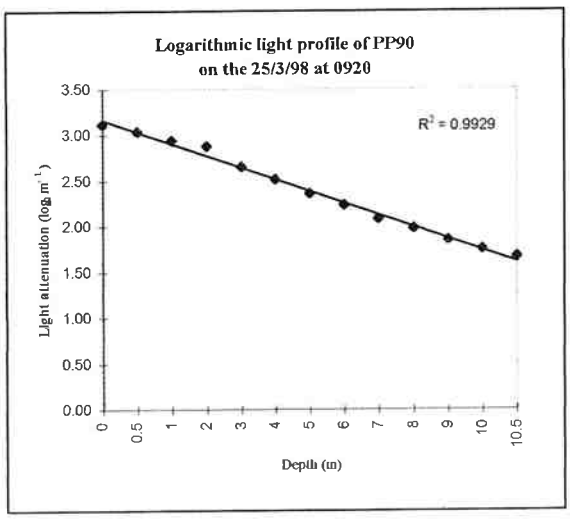
Figure 31 (continued)











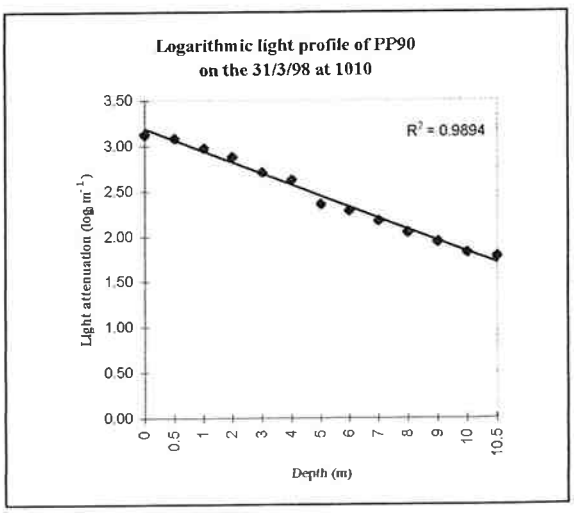
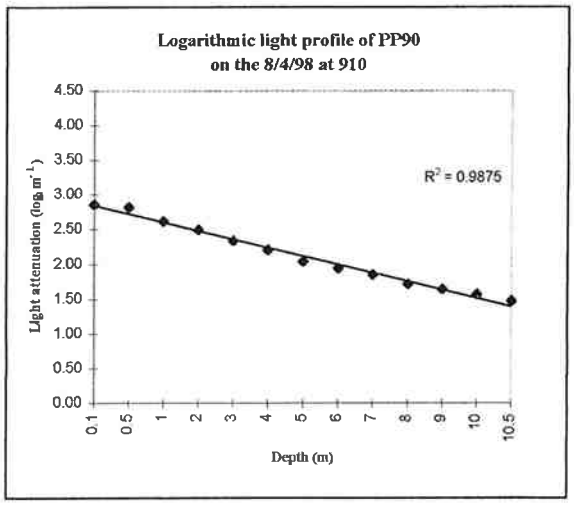
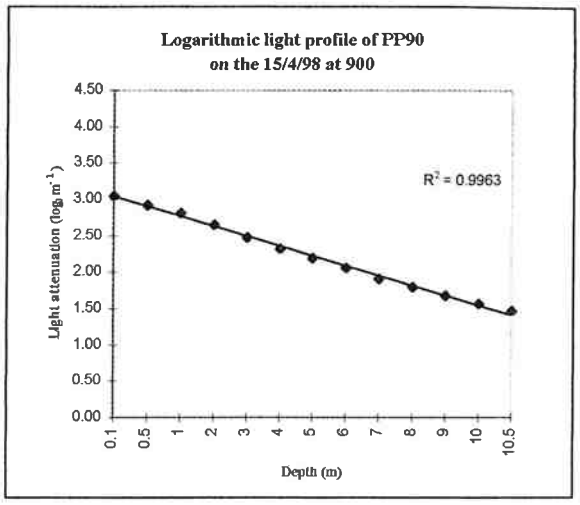
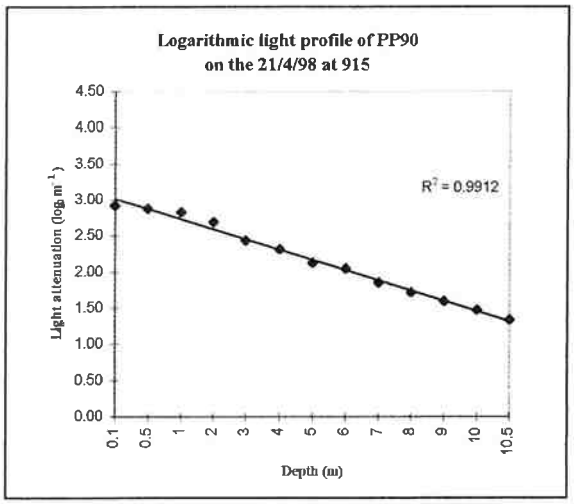
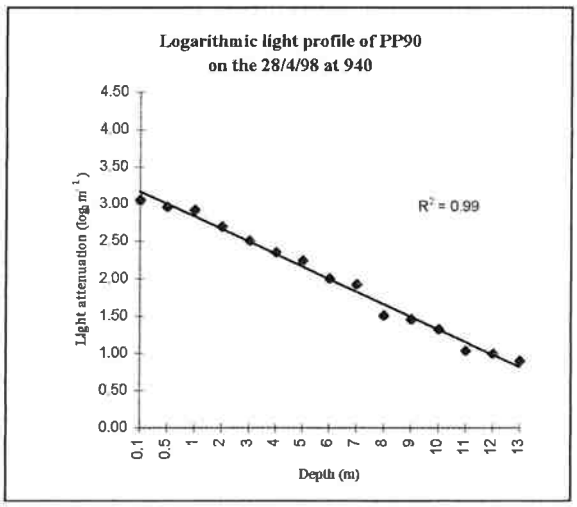


Figure 32 Logarithmic light profiles for sample site PP90 from 7/3/98 to 5/5/98









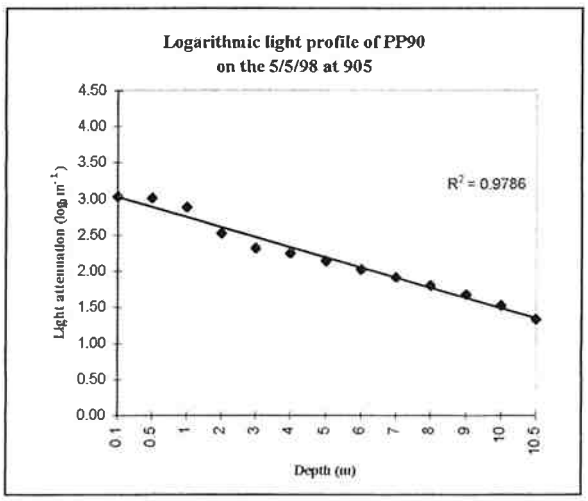


Figure 32 (continued)

Calibrated light logger time series data

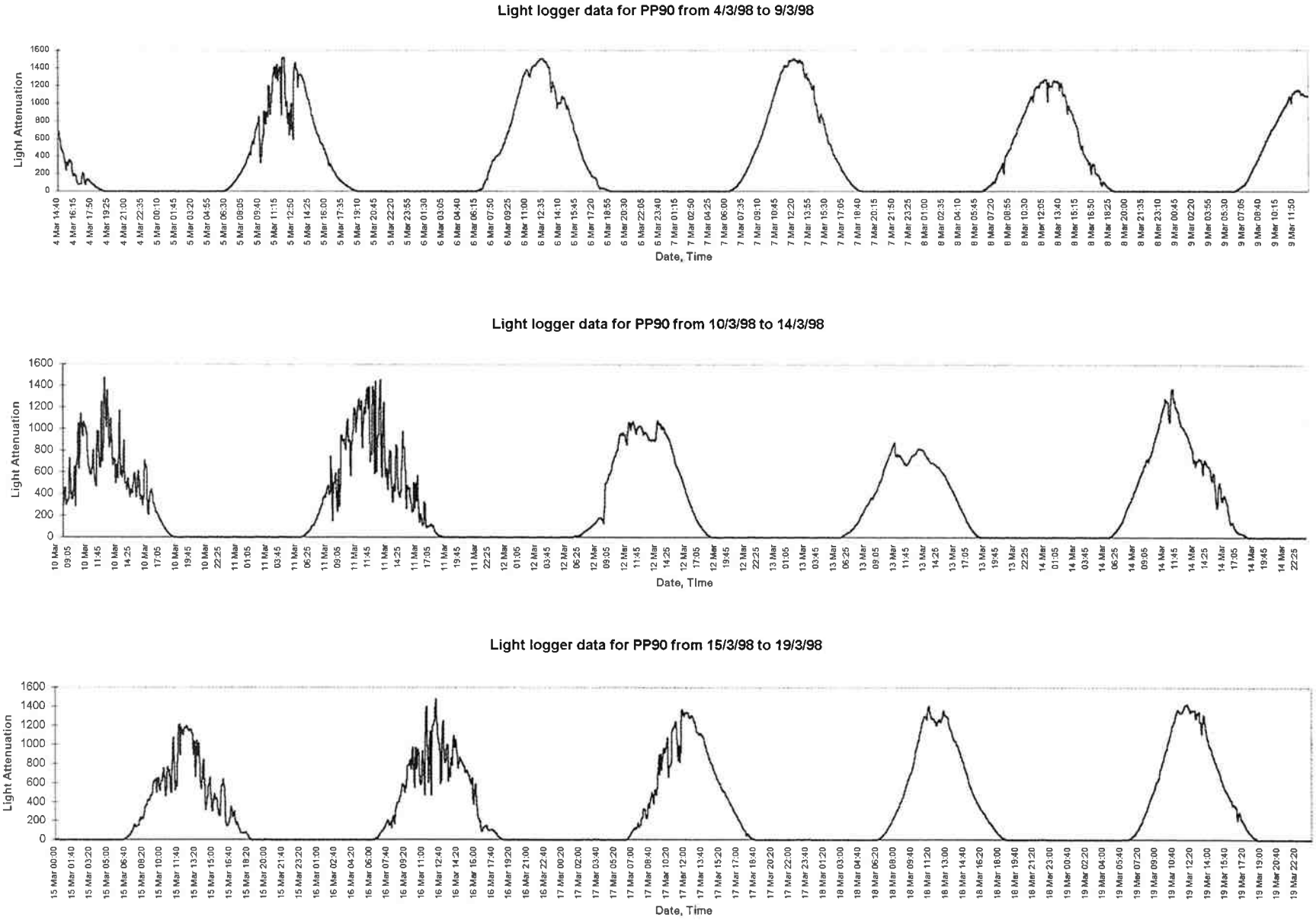


Figure 33 Light logger data for PP90 from 4/3/98 to 6/5/98 located 1.5m from bottom

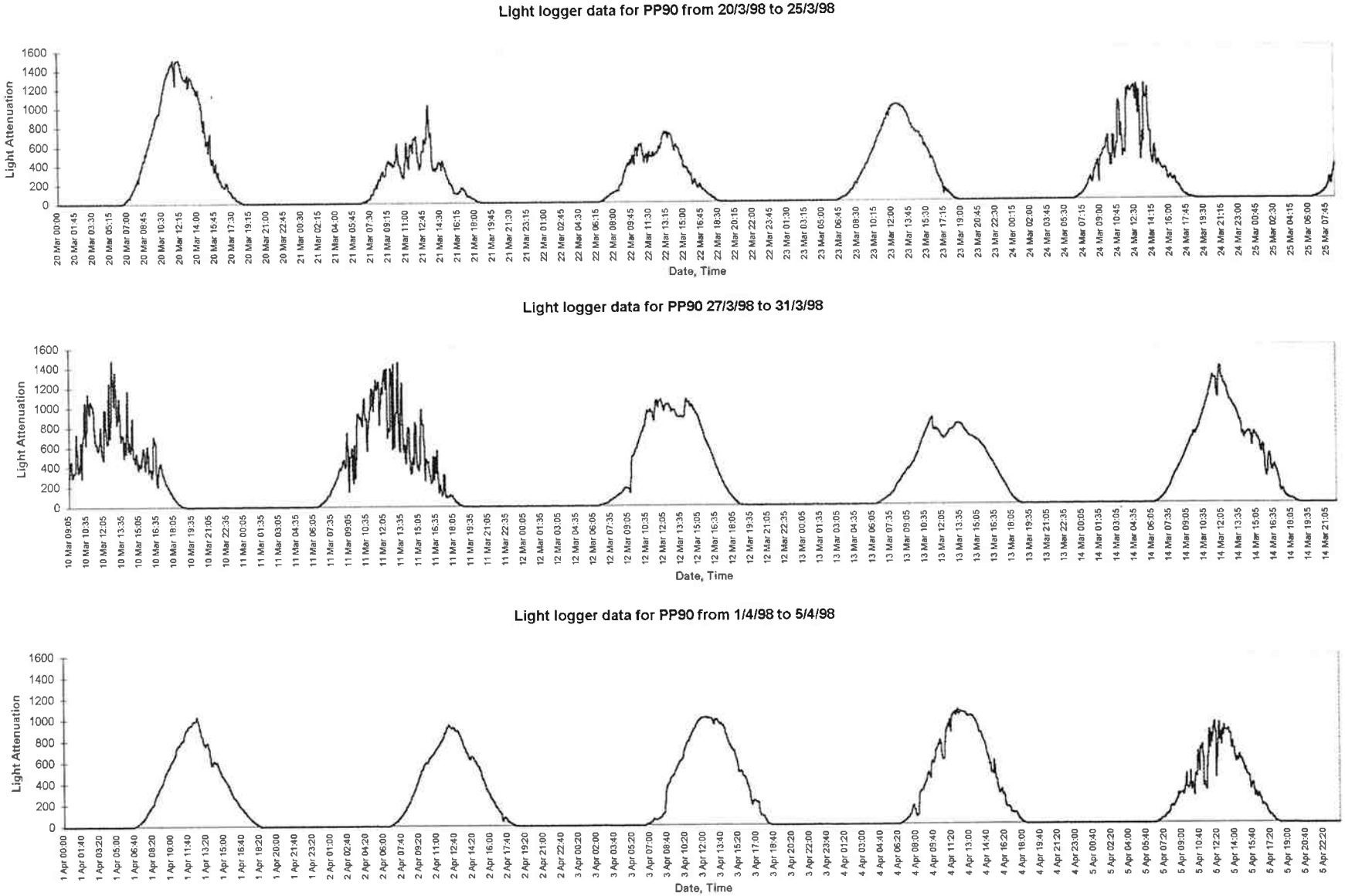


Figure 33 continued

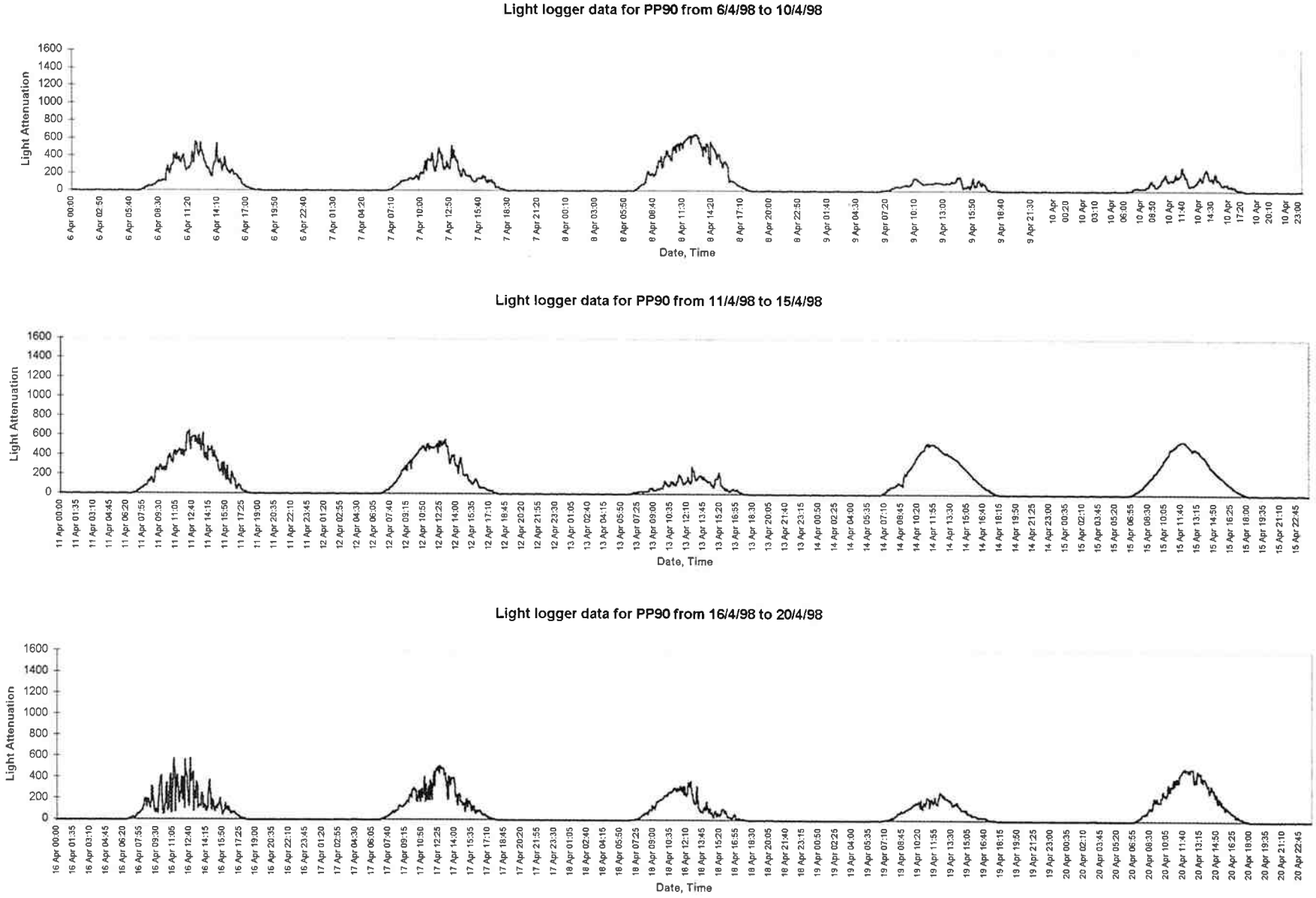


Figure 33 continued

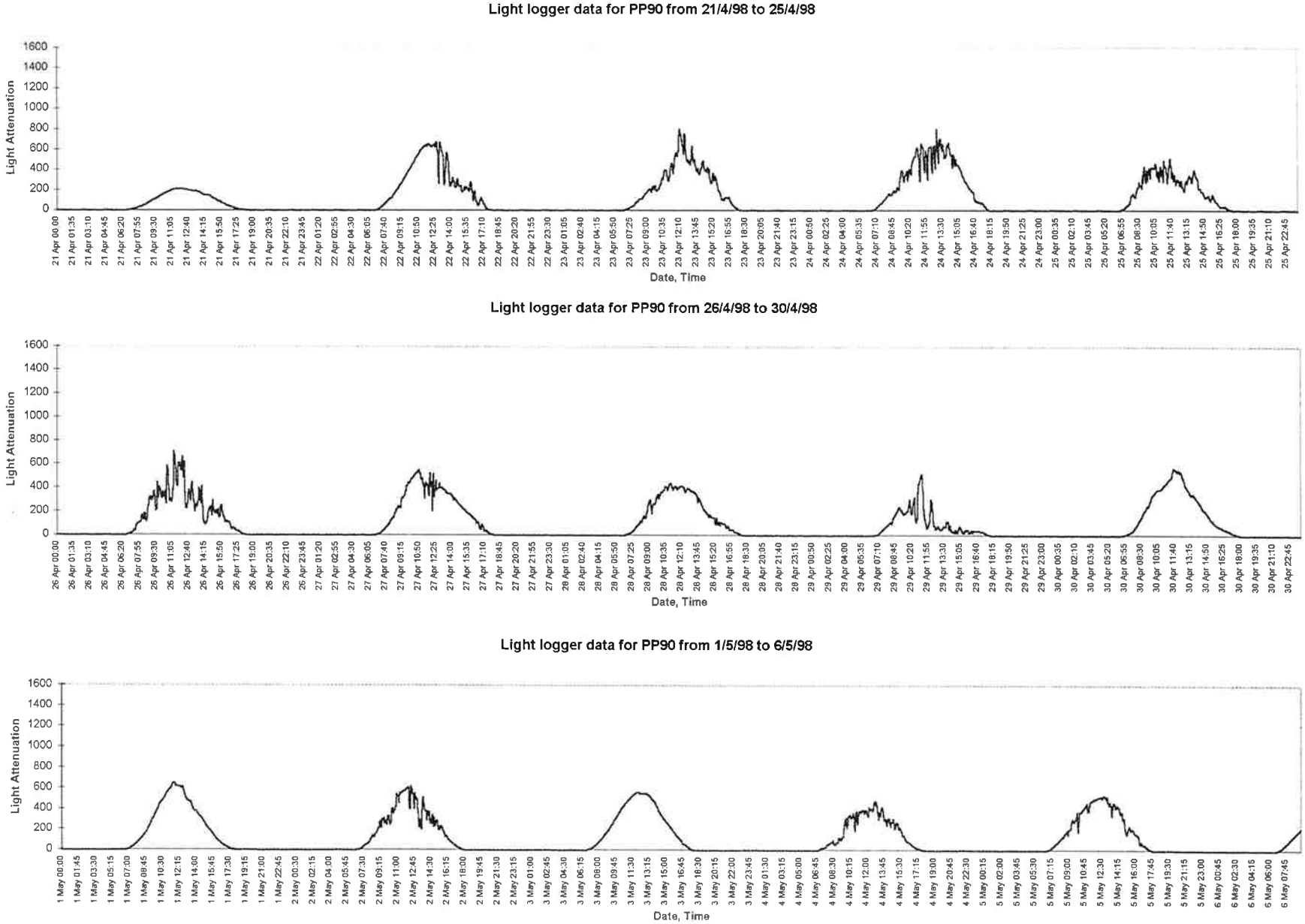


Figure 33 continued

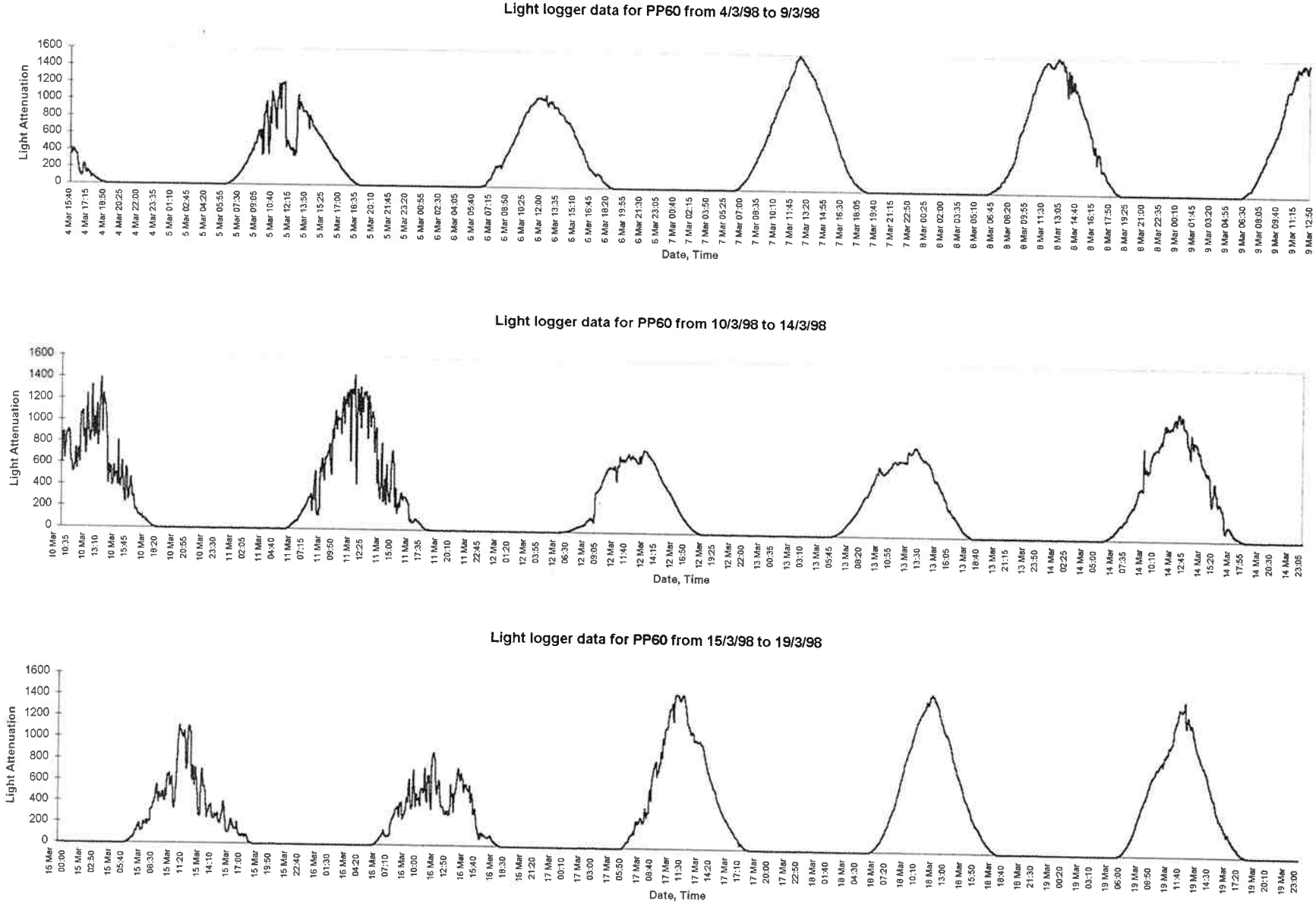
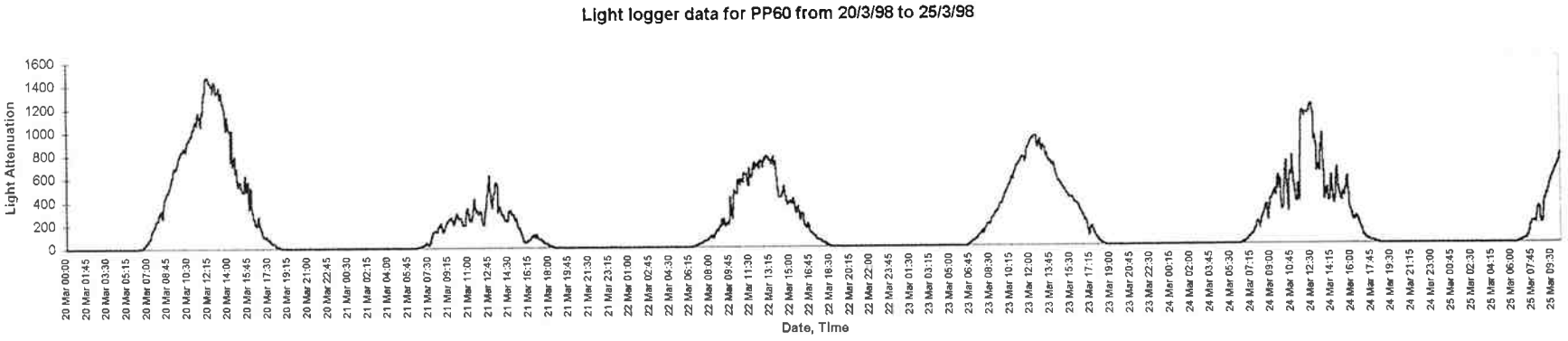
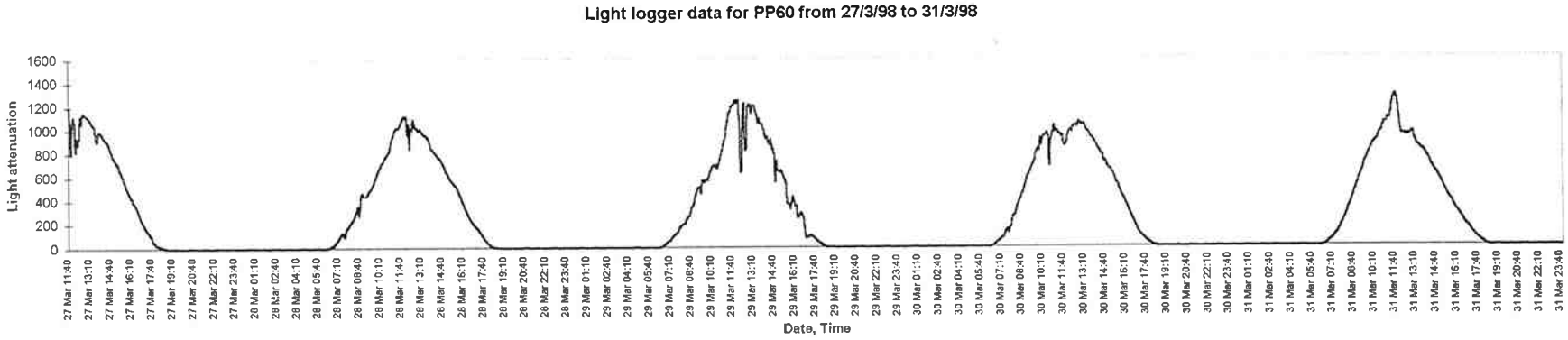


Figure 34 Light logger data for PP60 from 4/3/98 to 6/5/98 located 1.5m from the bottom





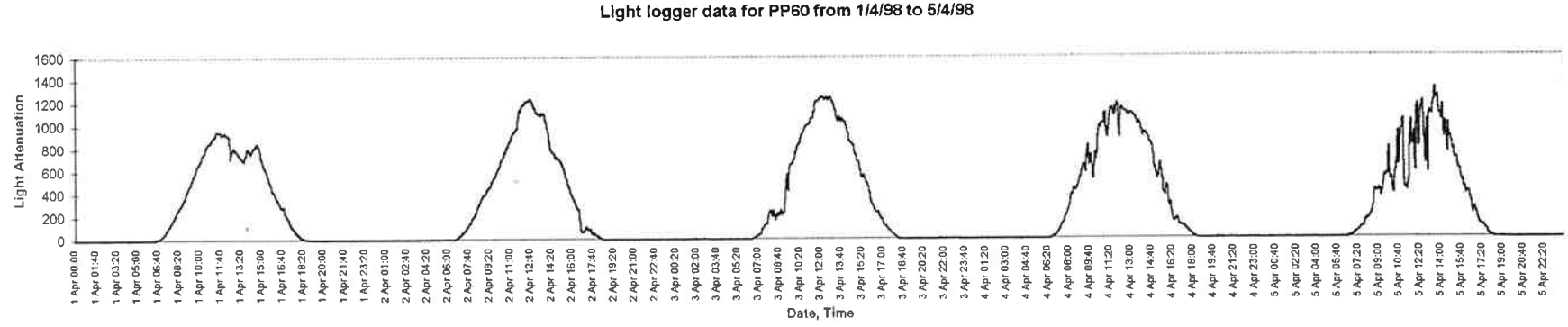
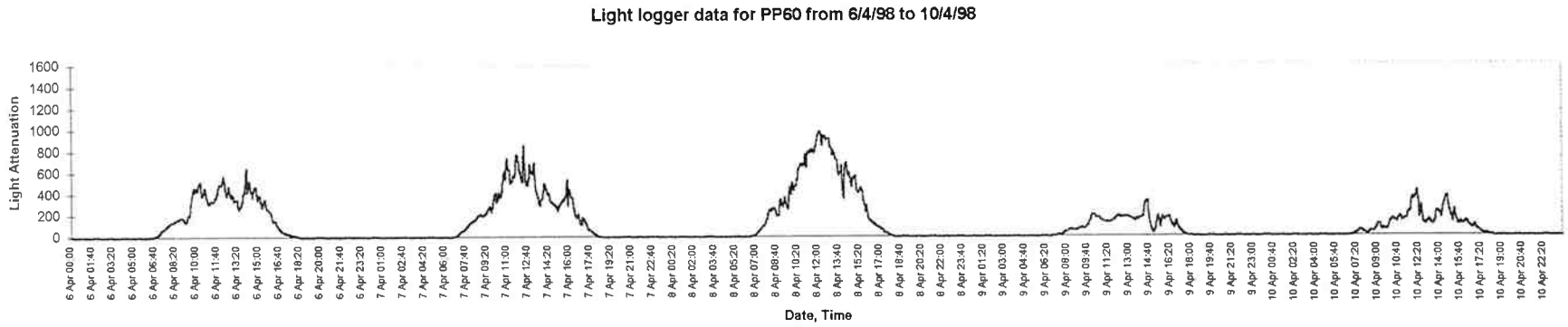
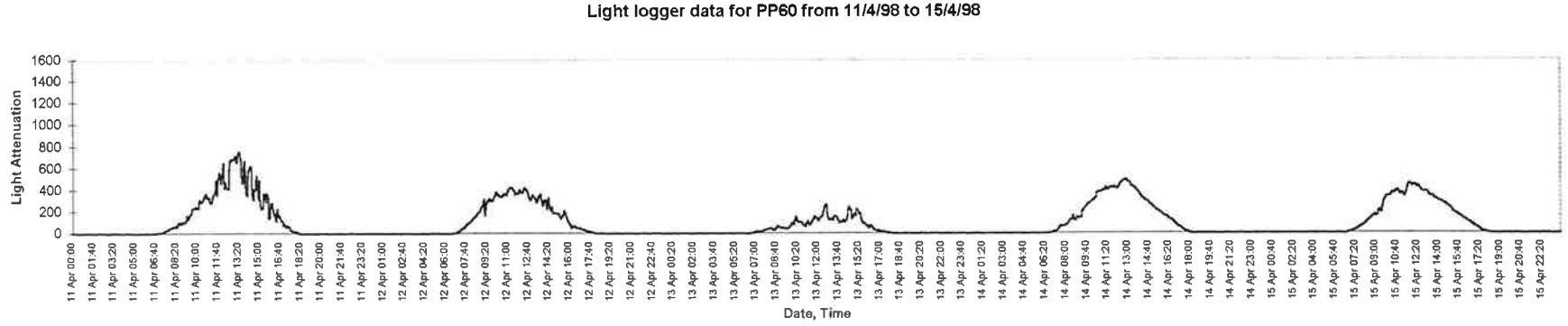


Figure 34 continued





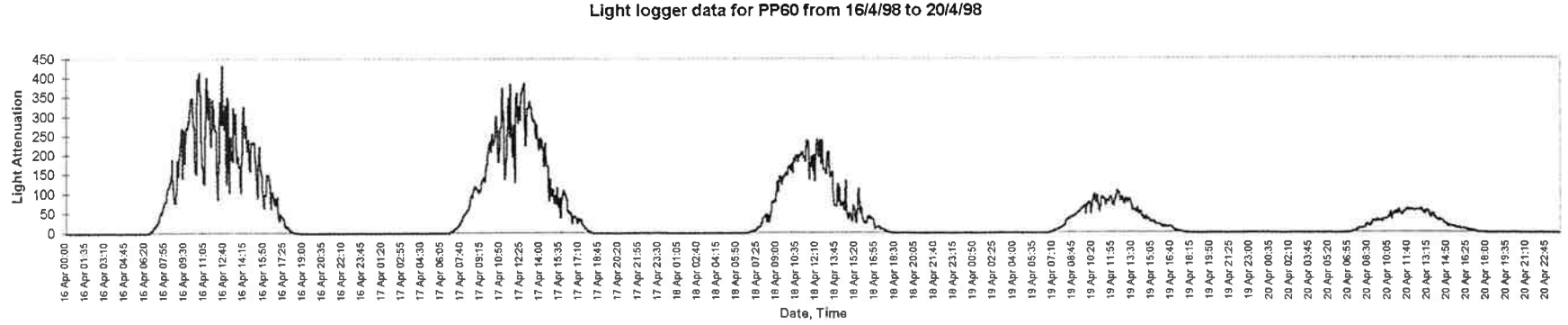
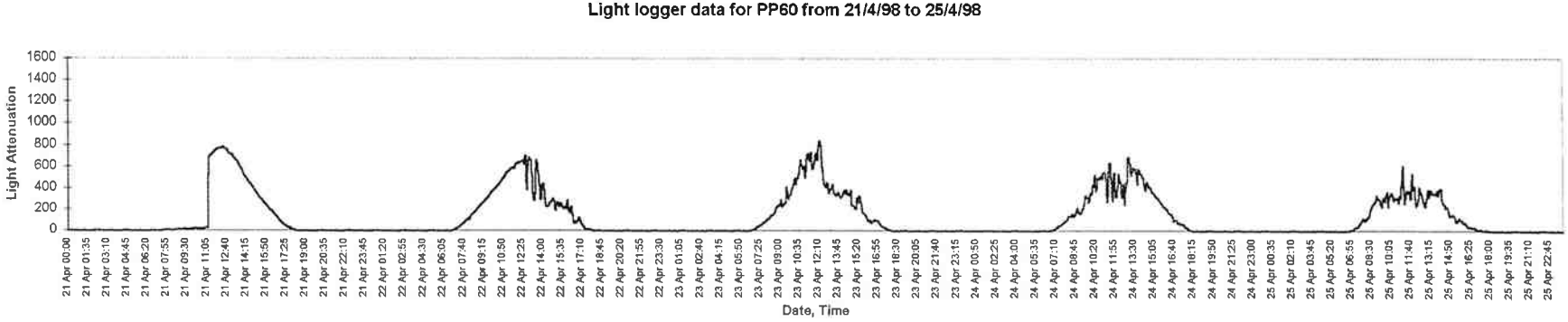
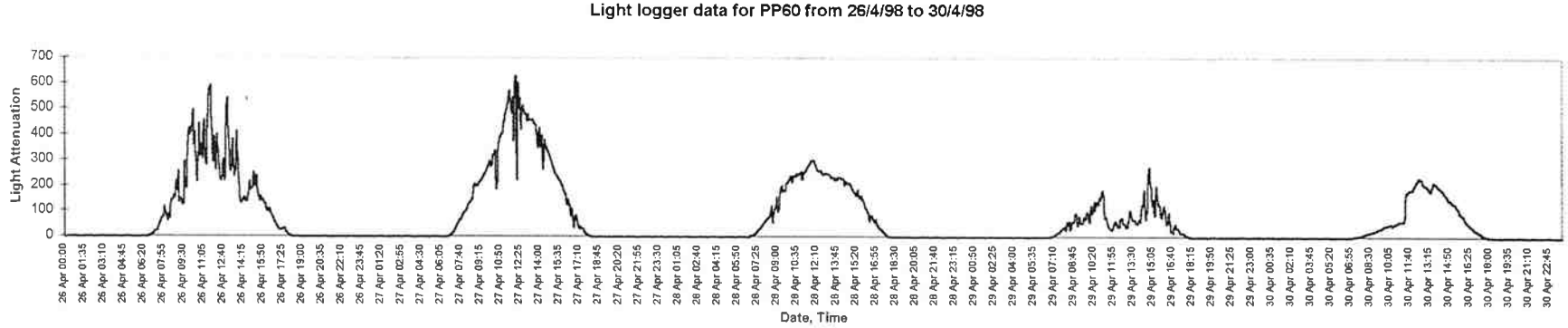


Figure 34 continued





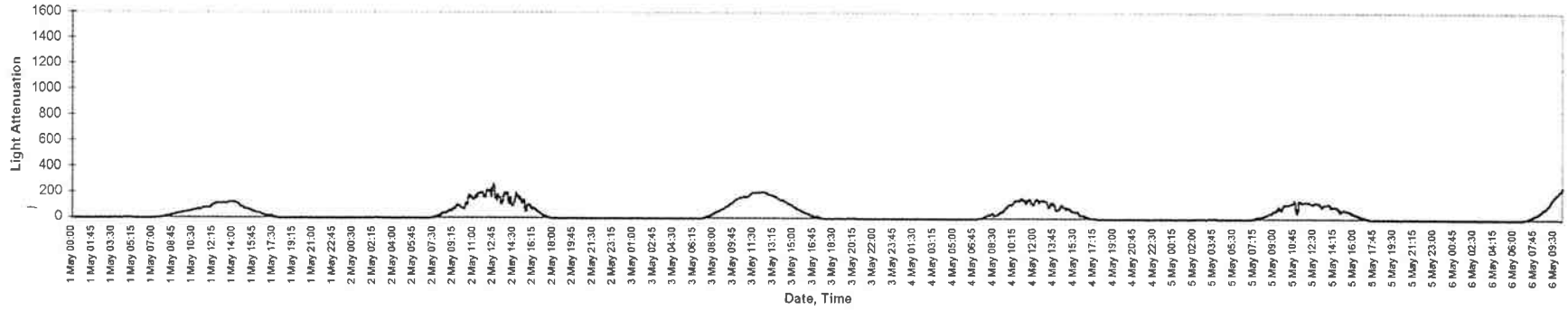


Figure 34 continued

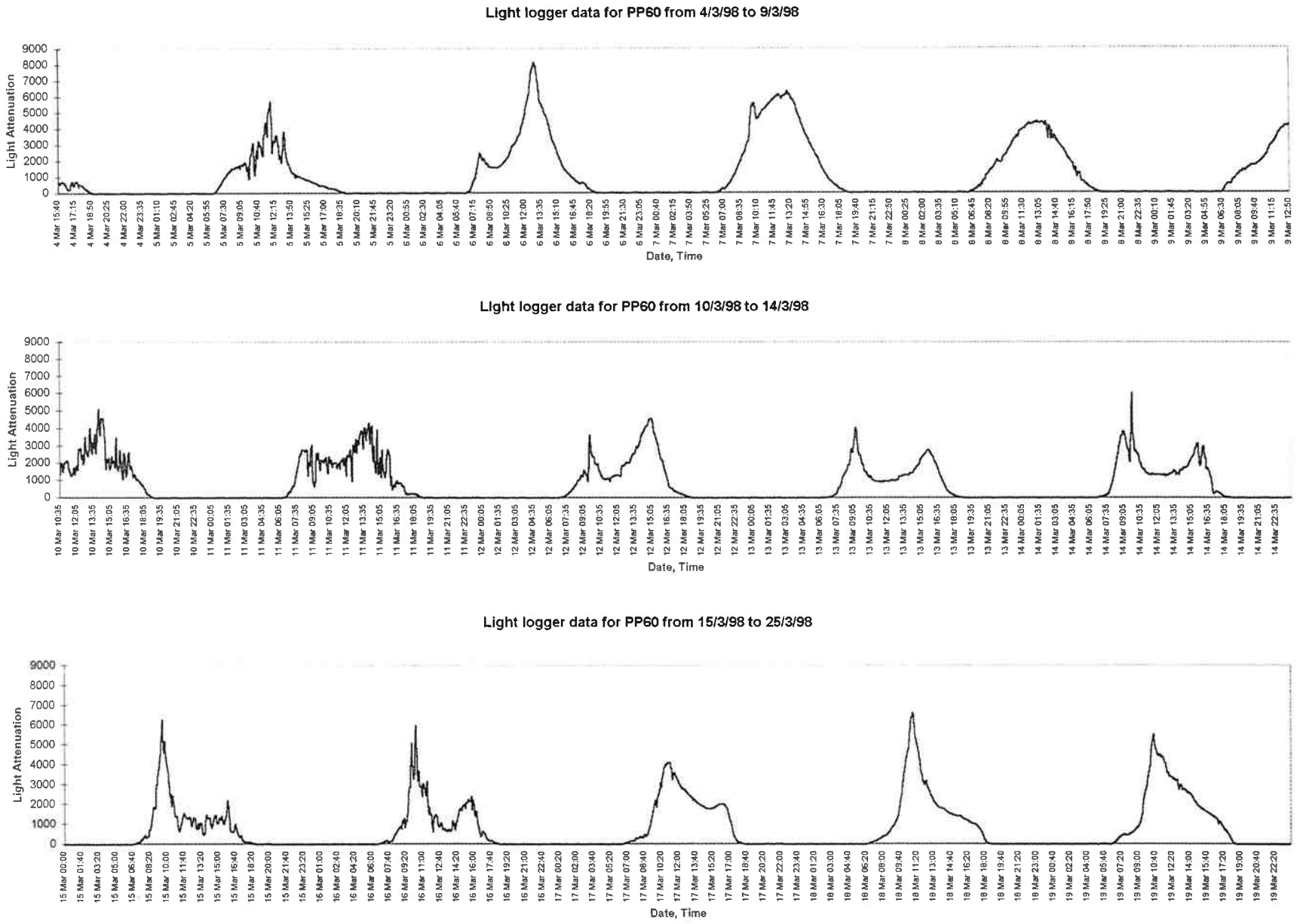


Figure 35 Light logger data for PP60 from 4/3/98 to 6/5/98 located 12m from the bottom

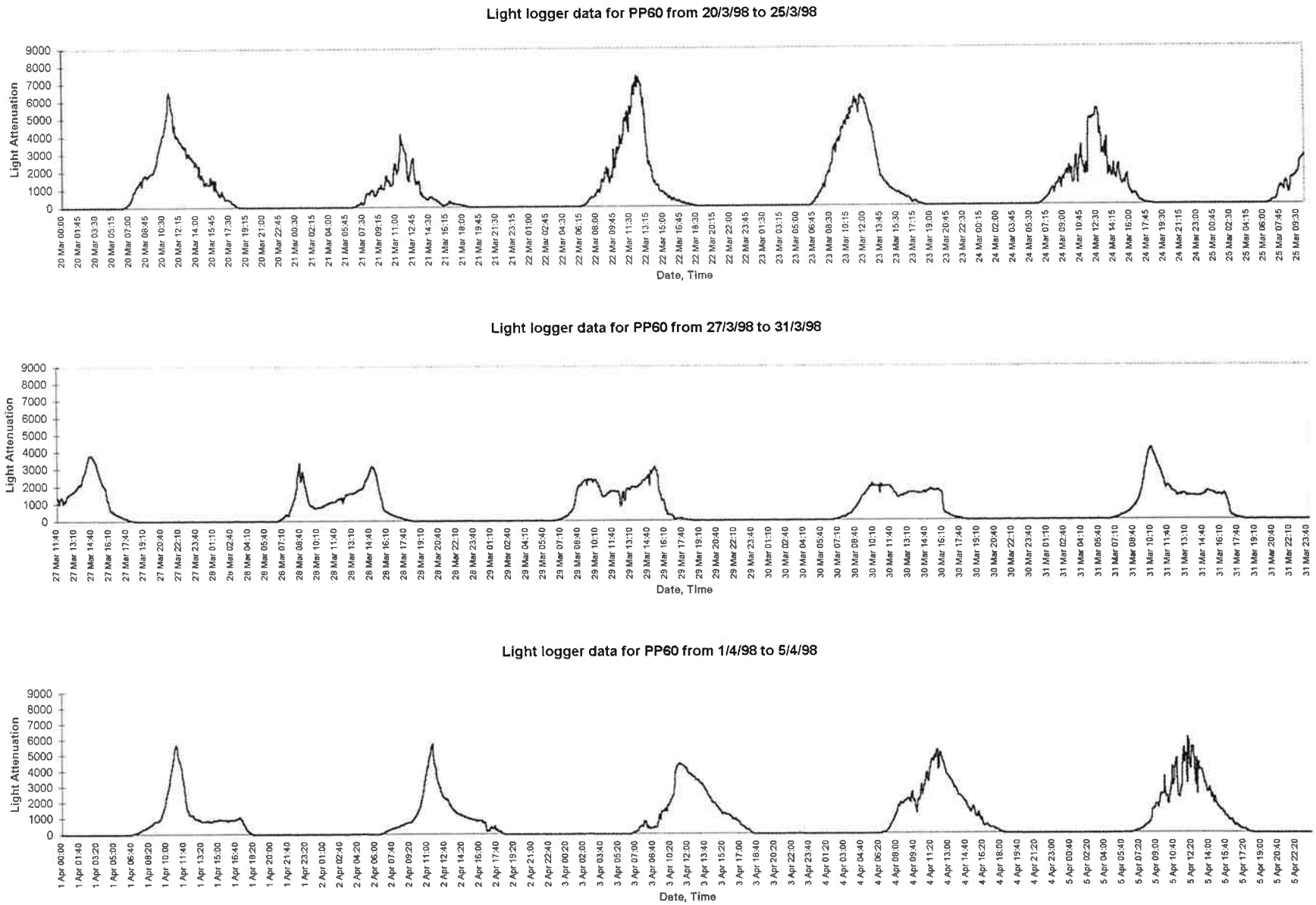
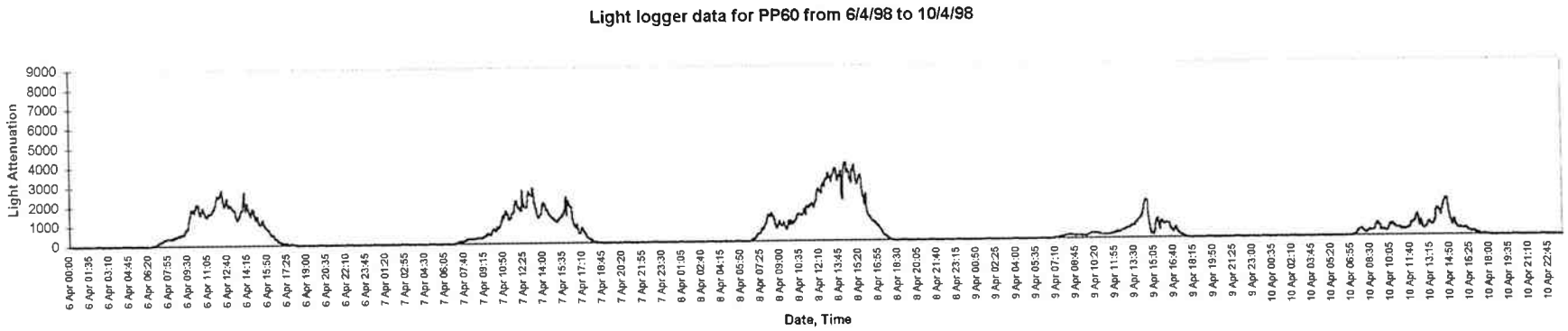
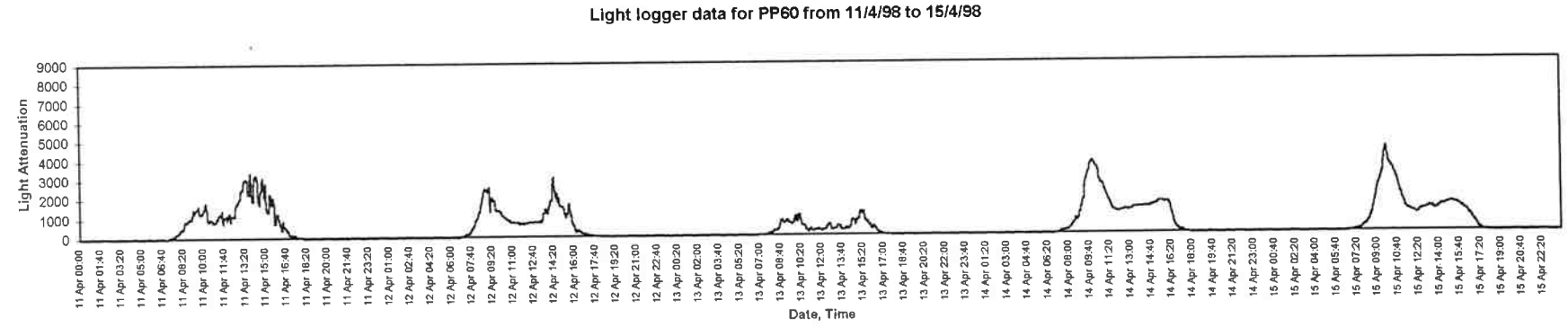


Figure 35 continued





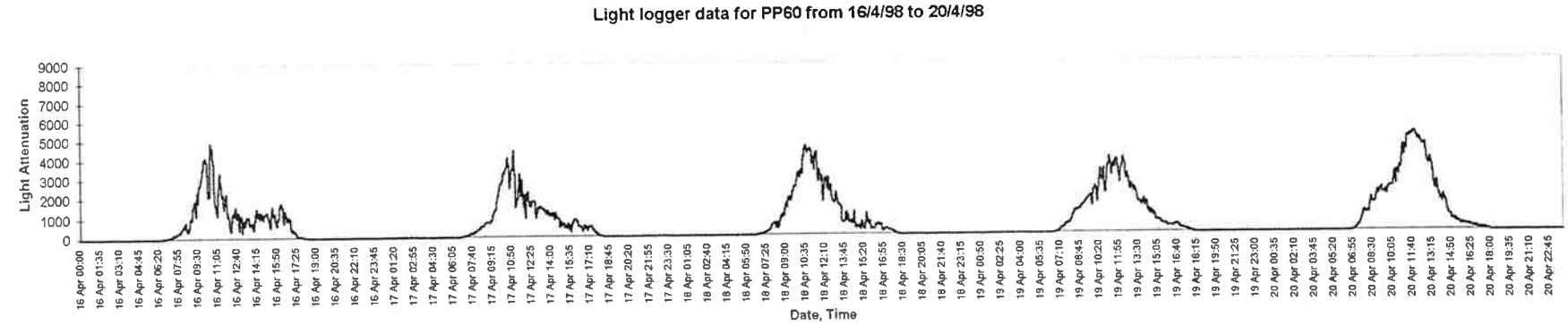
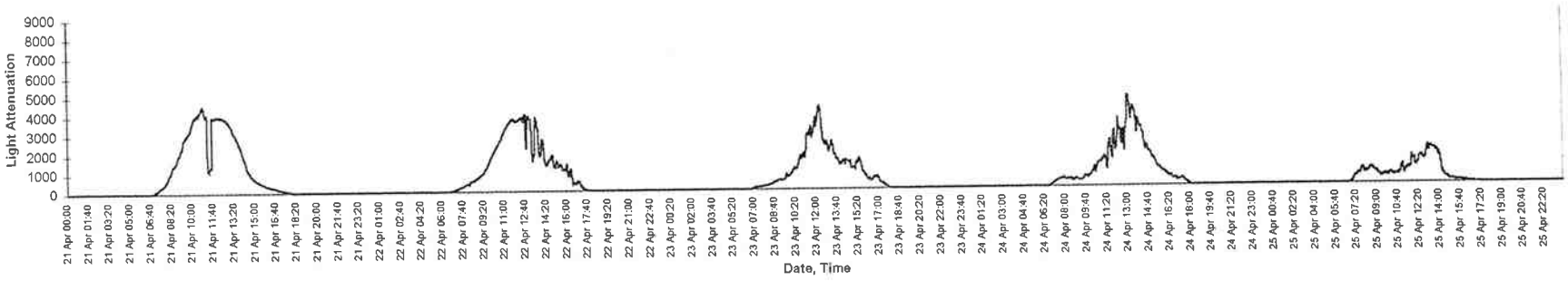
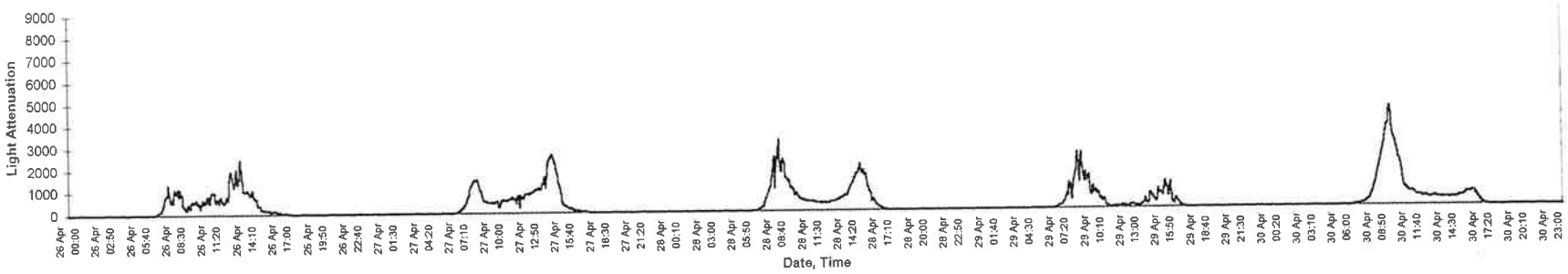


Figure 35 continued

Light logger data for PP60 from 21/4/98 to 25/4/98



Light logger data for PP60 from 26/4/98 to 30/4/98



Light logger data for PP60 from 1/5/98 to 6/5/98

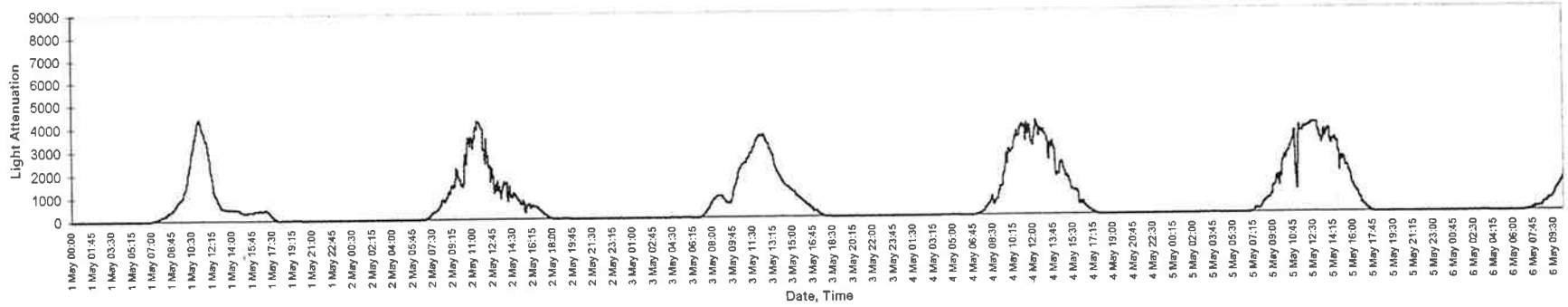


Figure 35 continued

Calibrated temperature logger time series data

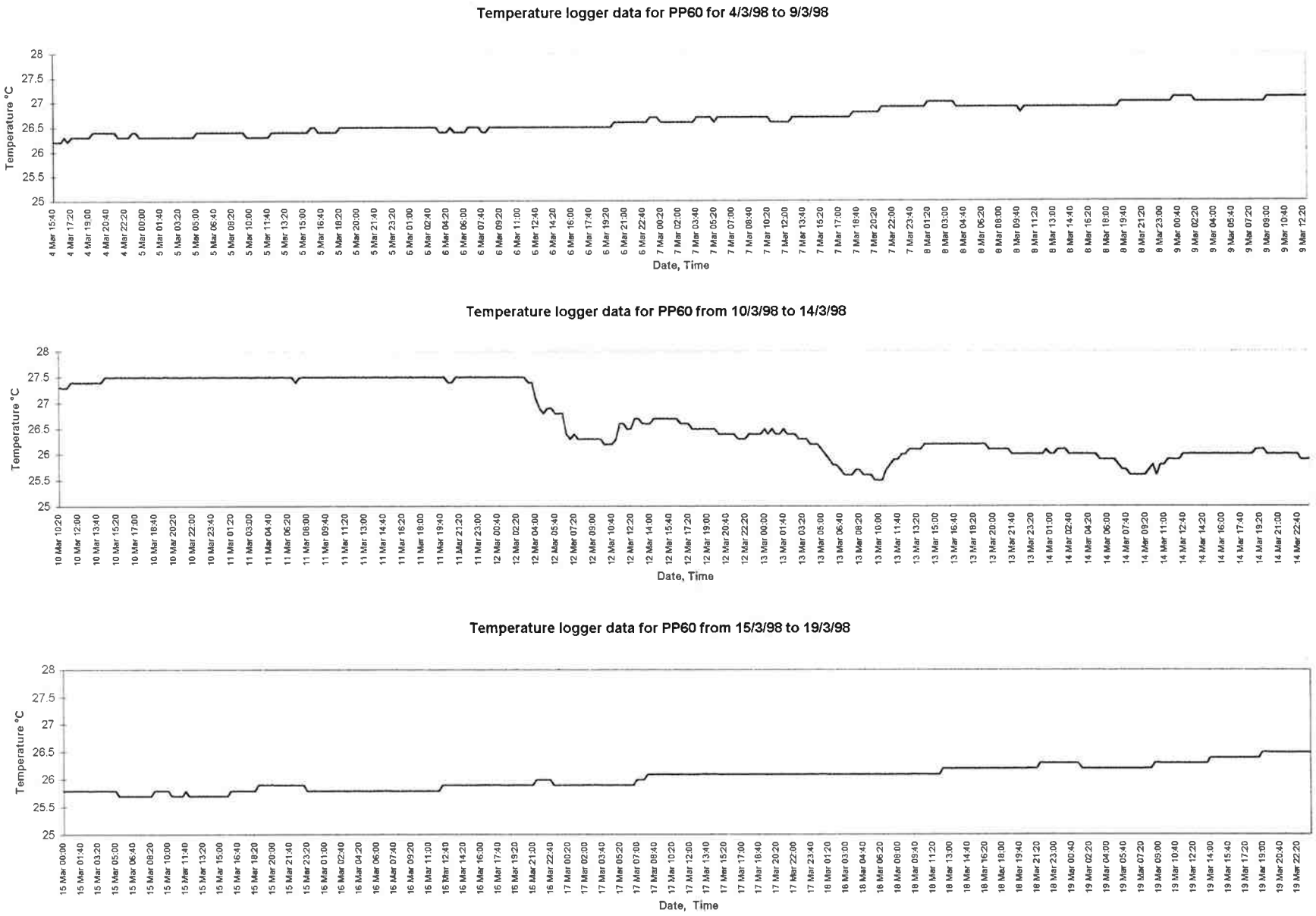


Figure 36 Temperature logger data for PP60 from 4/3/98 to 6/5/98 located 1m from the bottom

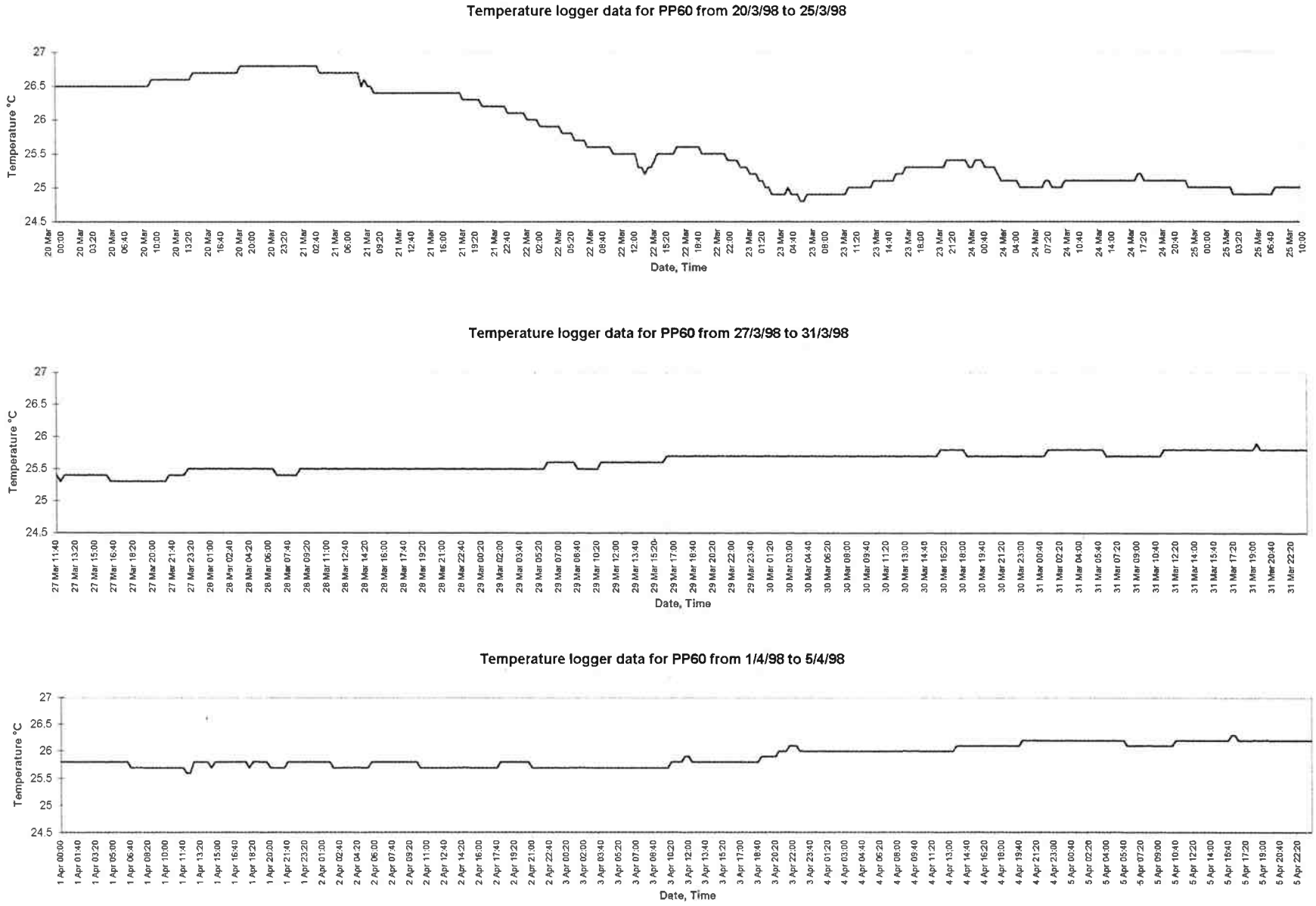


Figure 36 continued

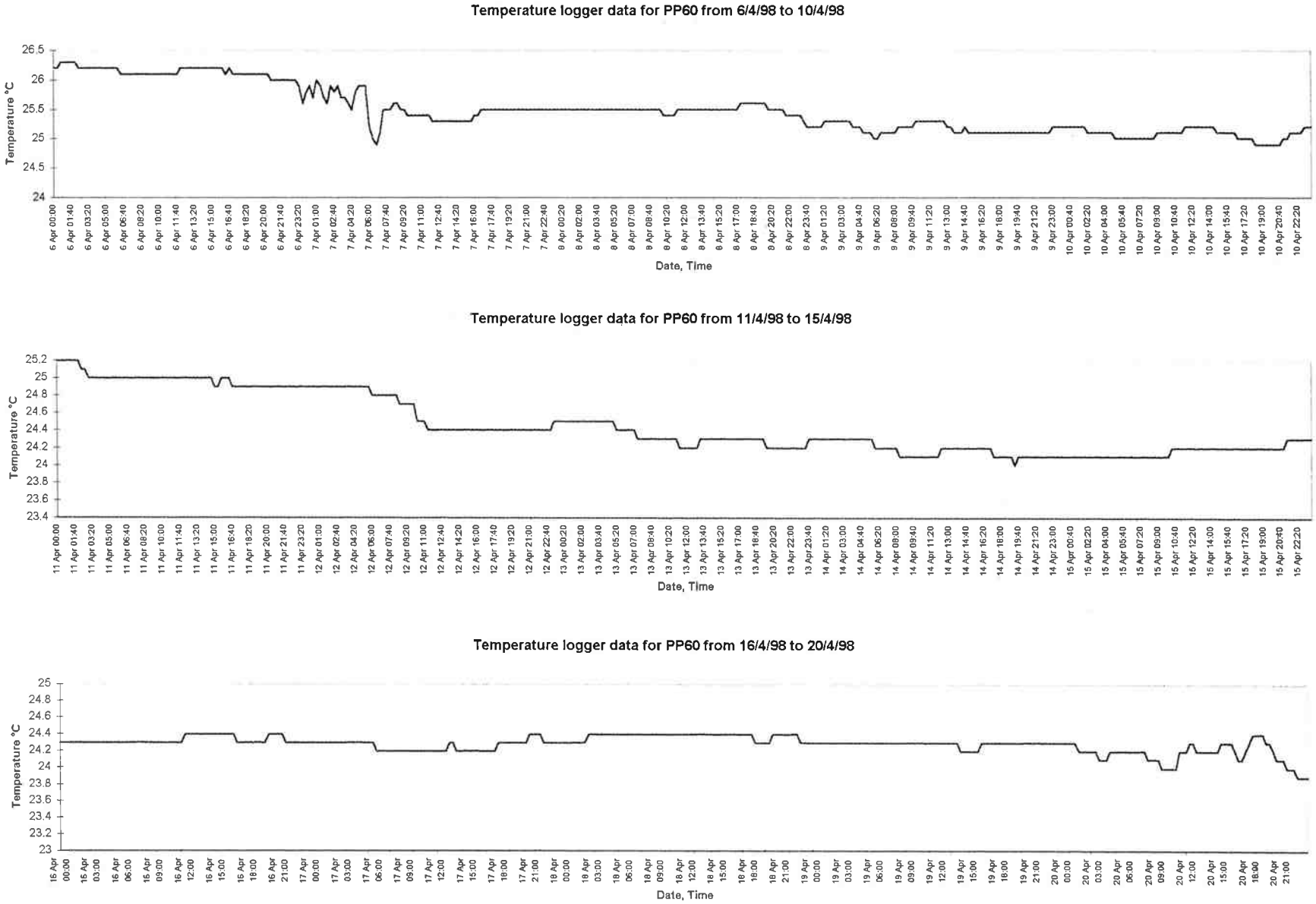


Figure 36 continued

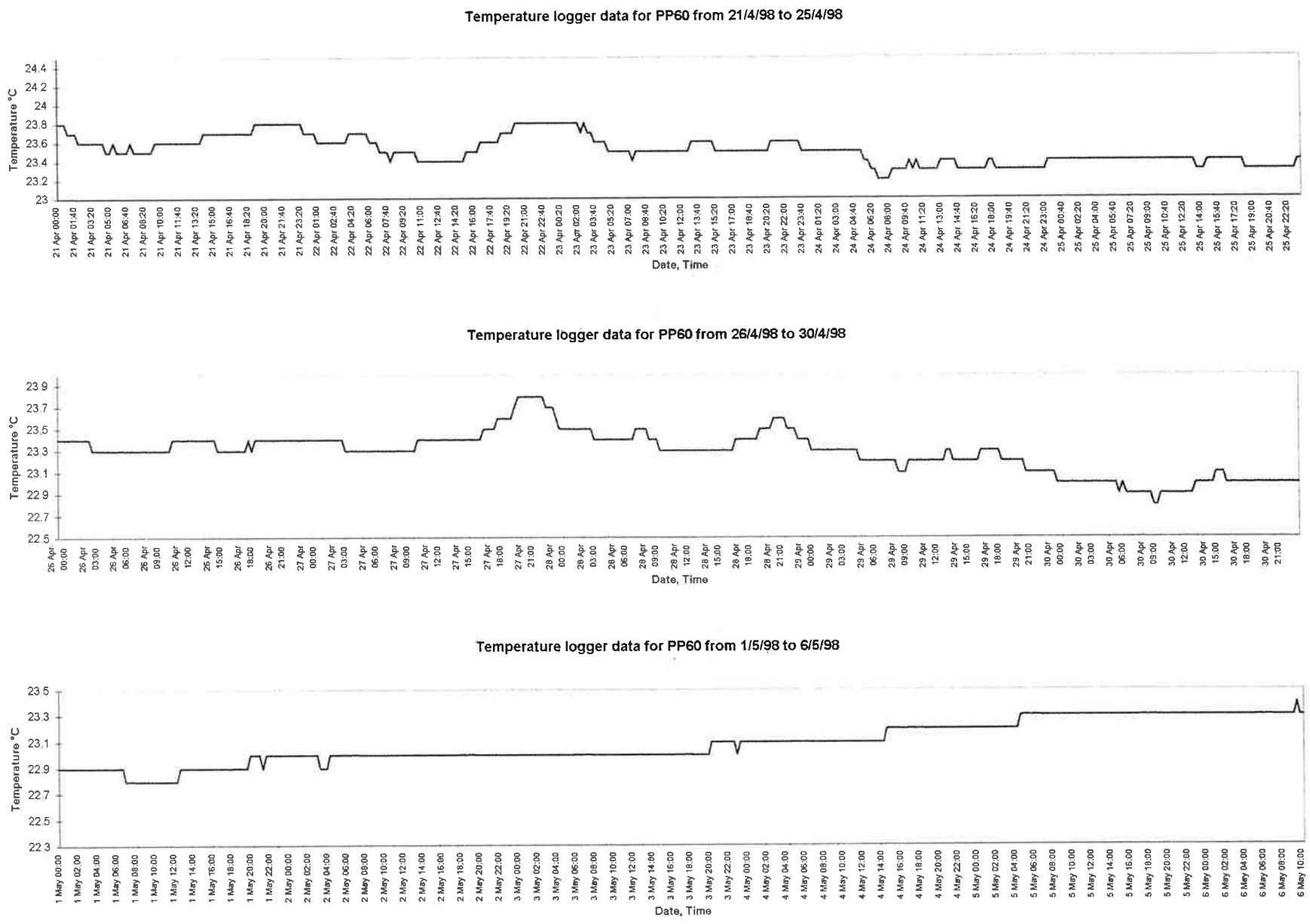


Figure 36 continued

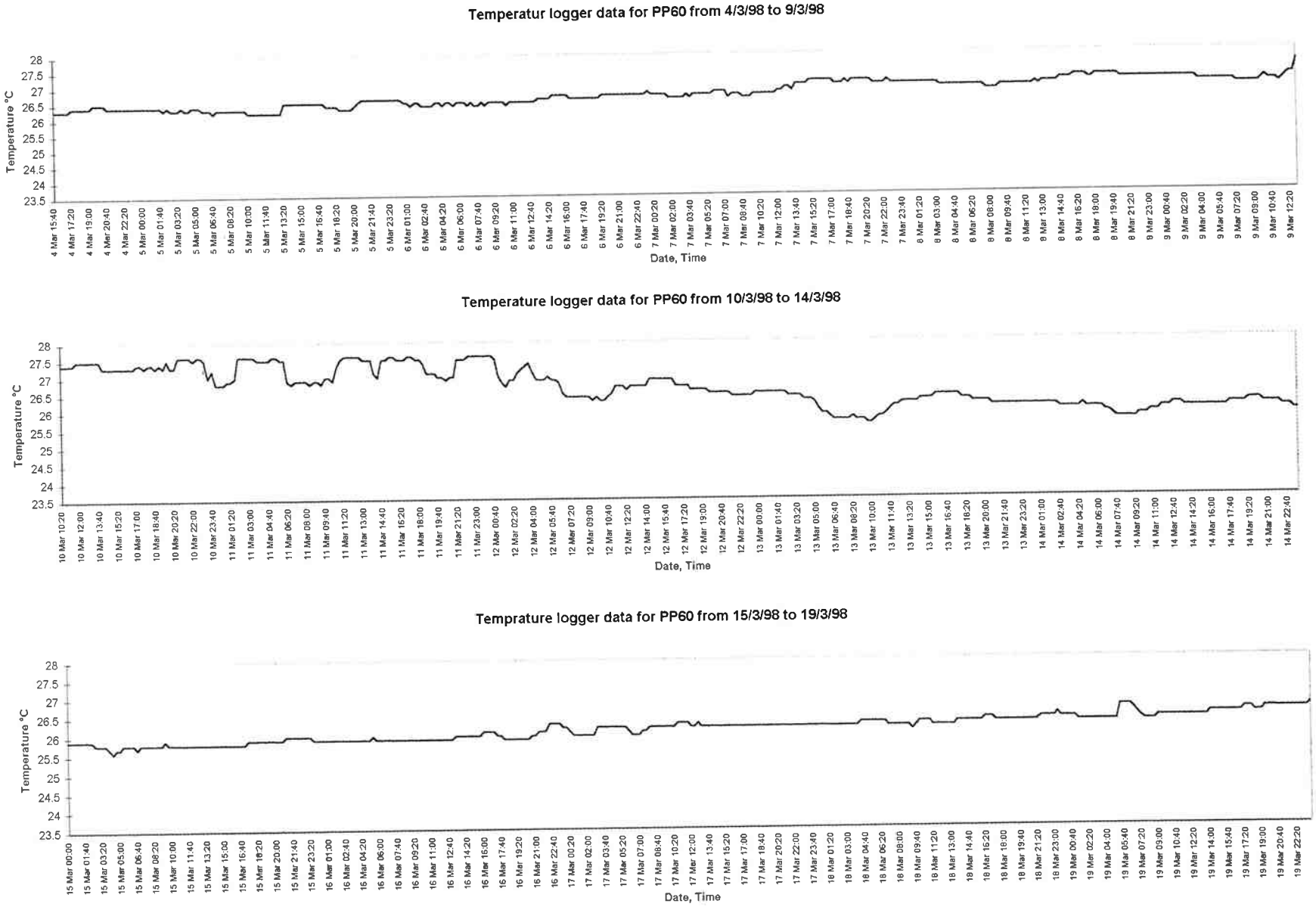


Figure 37 Temperature logger data for PP60 for 4/3/98 to 6/5/98 located 7m from the bottom

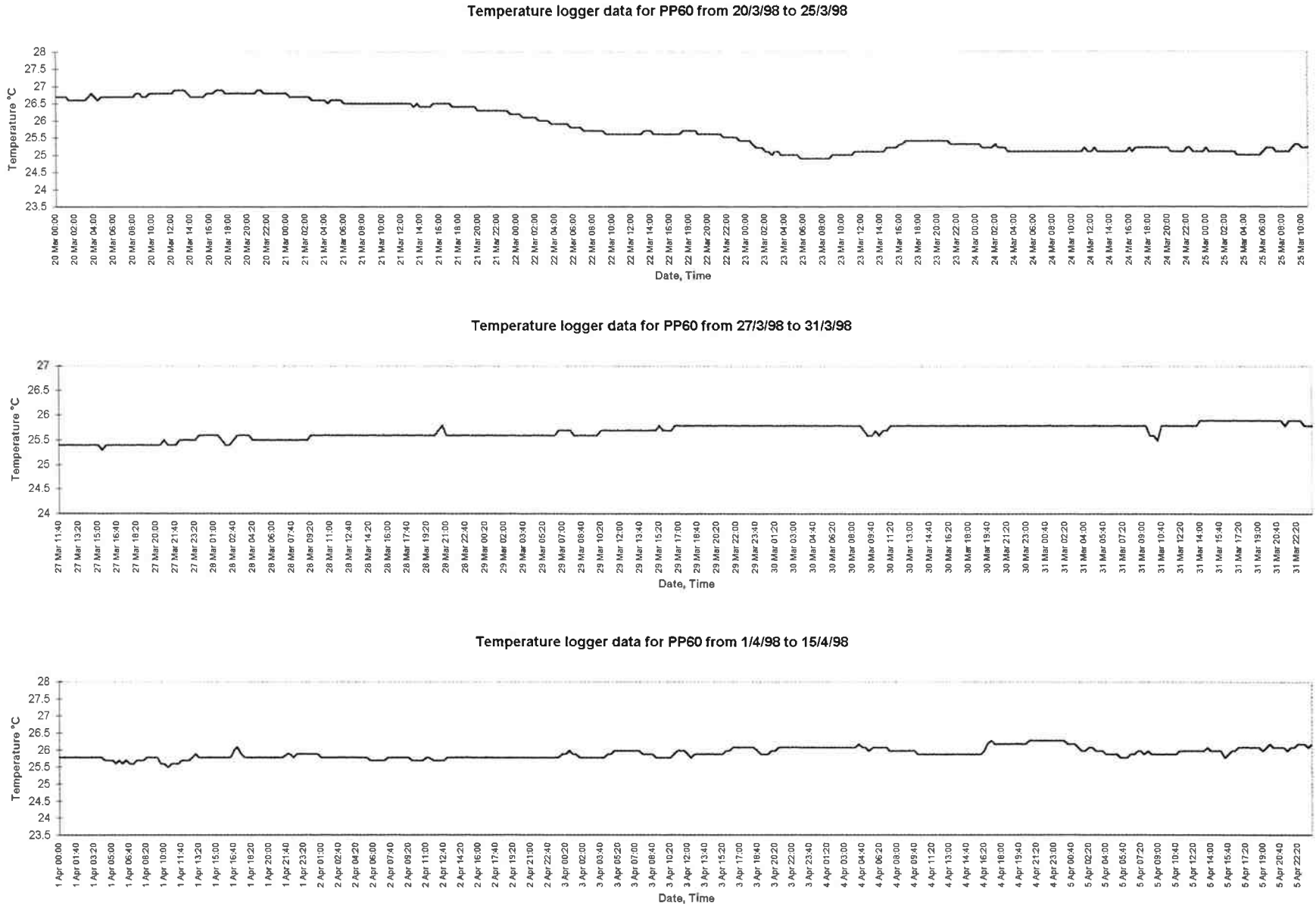


Figure 37continued

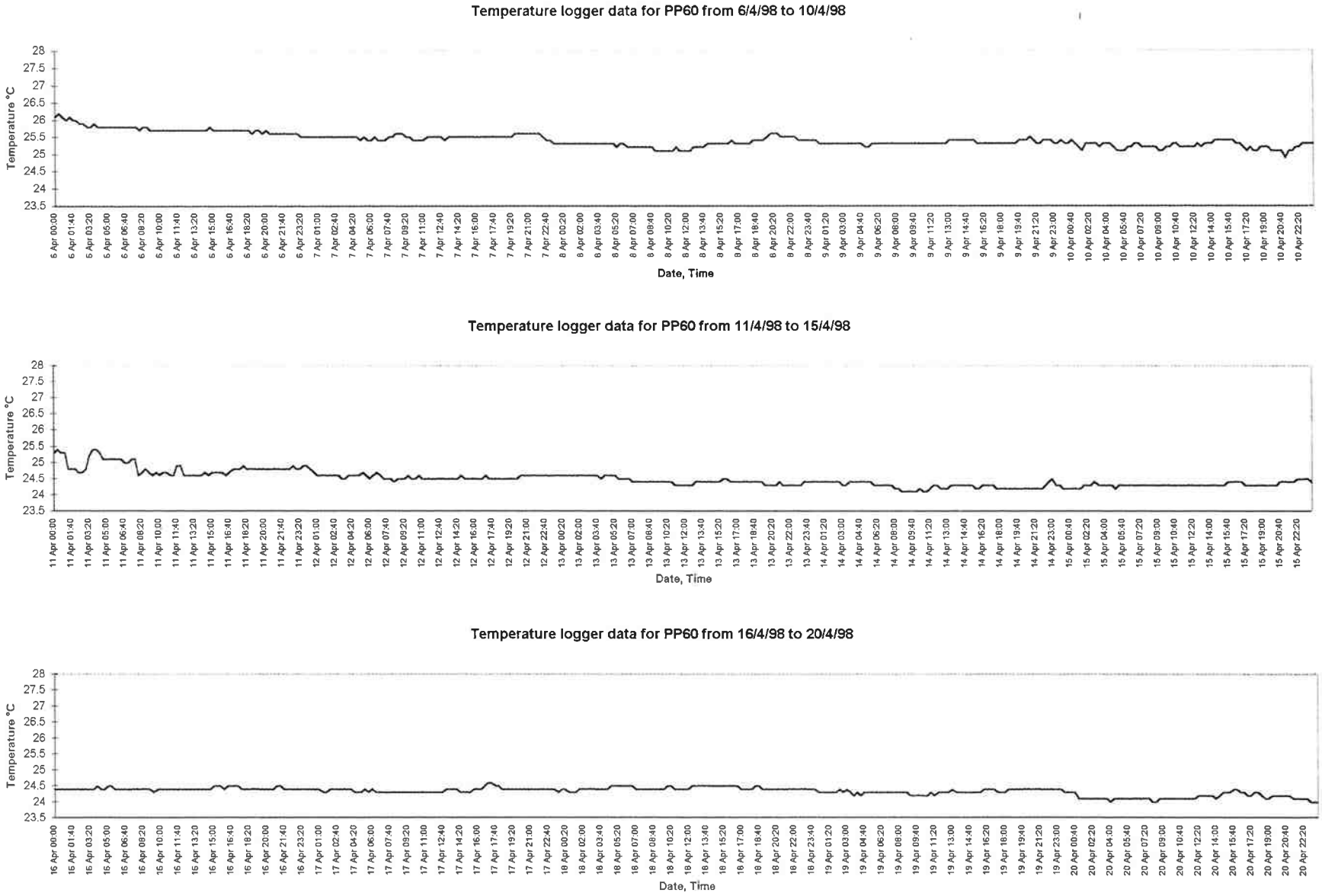
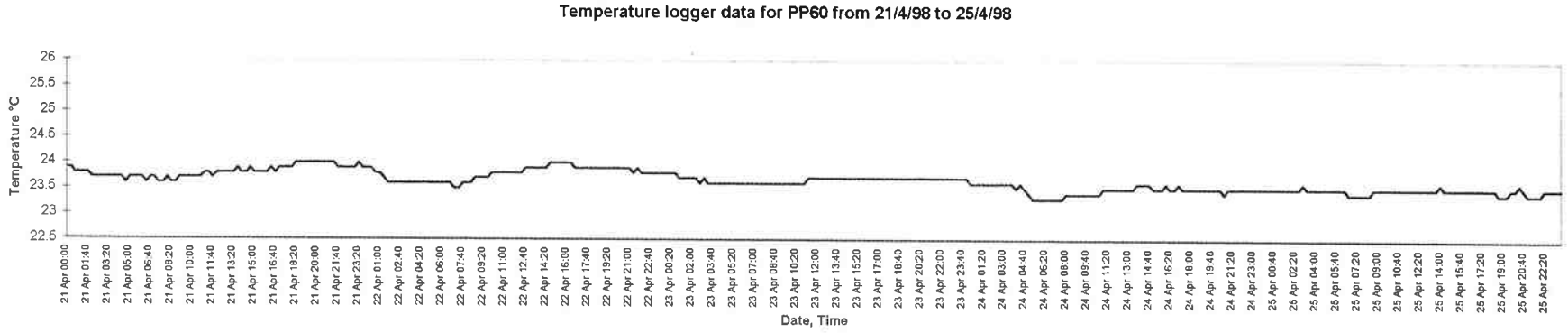
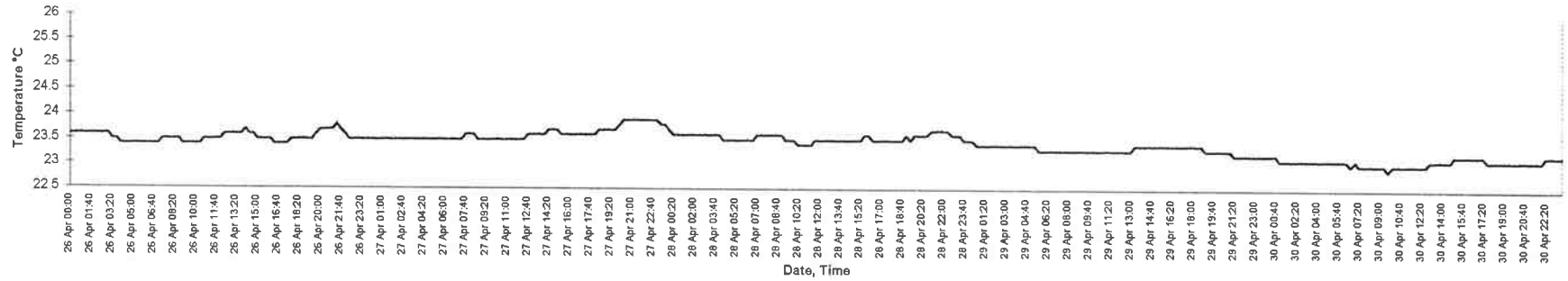


Figure 37 continued





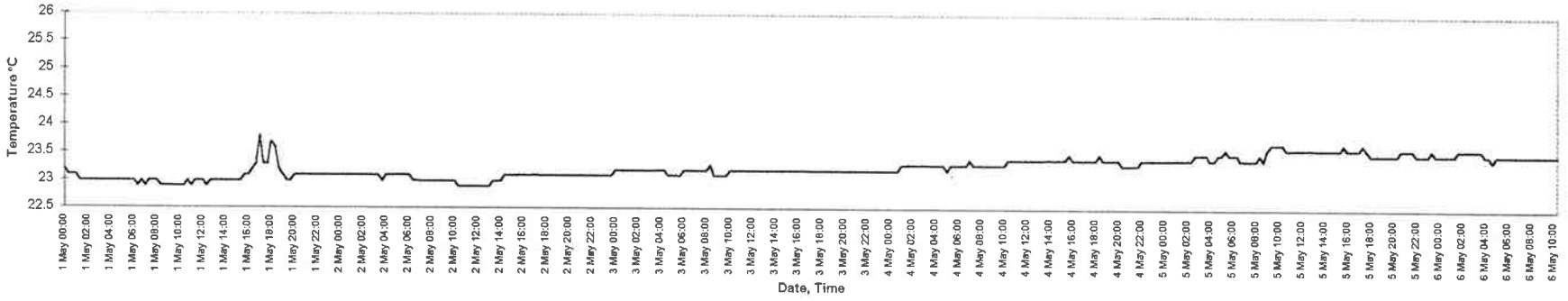


Figure 37 continued

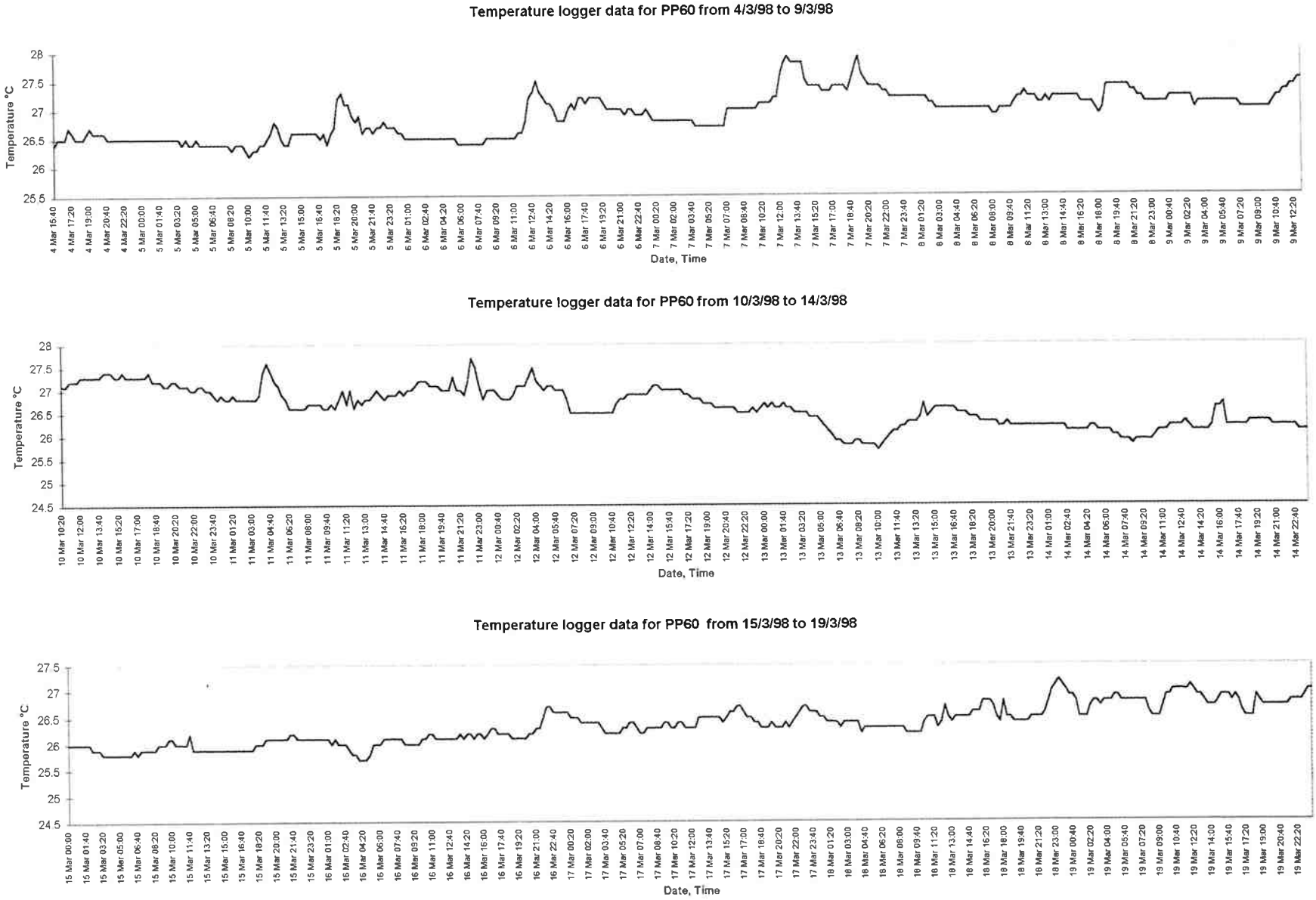
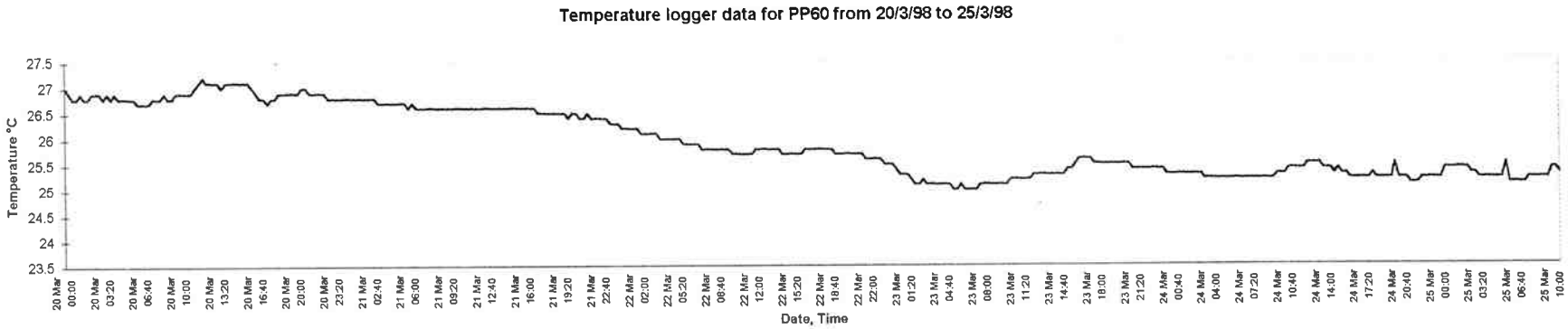
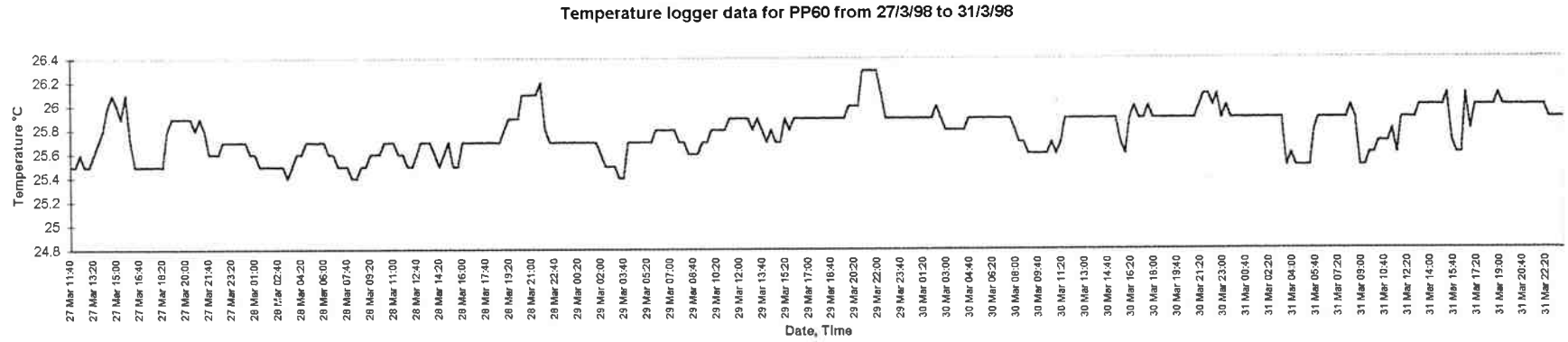


Figure 38 Temperature logger data for PP60 from 4/3/98 to 6/5/98 located 12m from the bottom





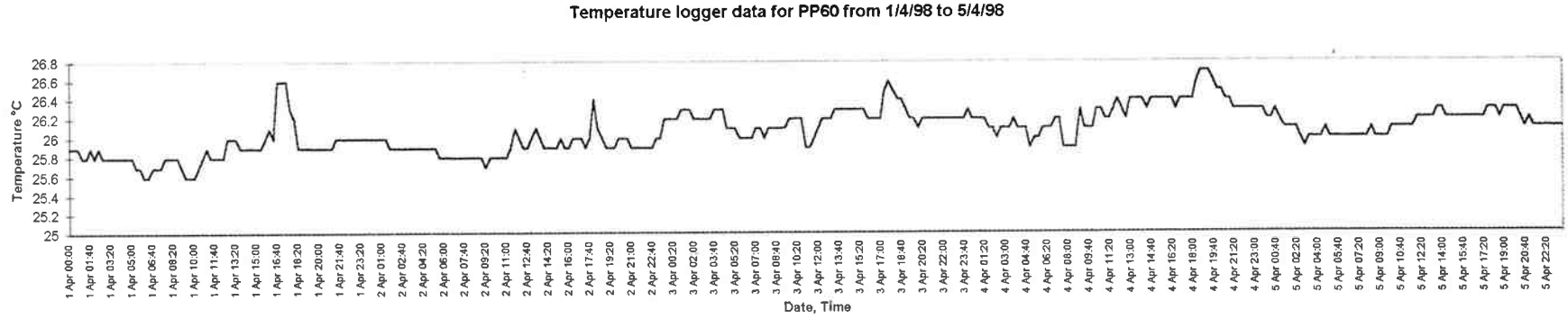


Figure 38 continued

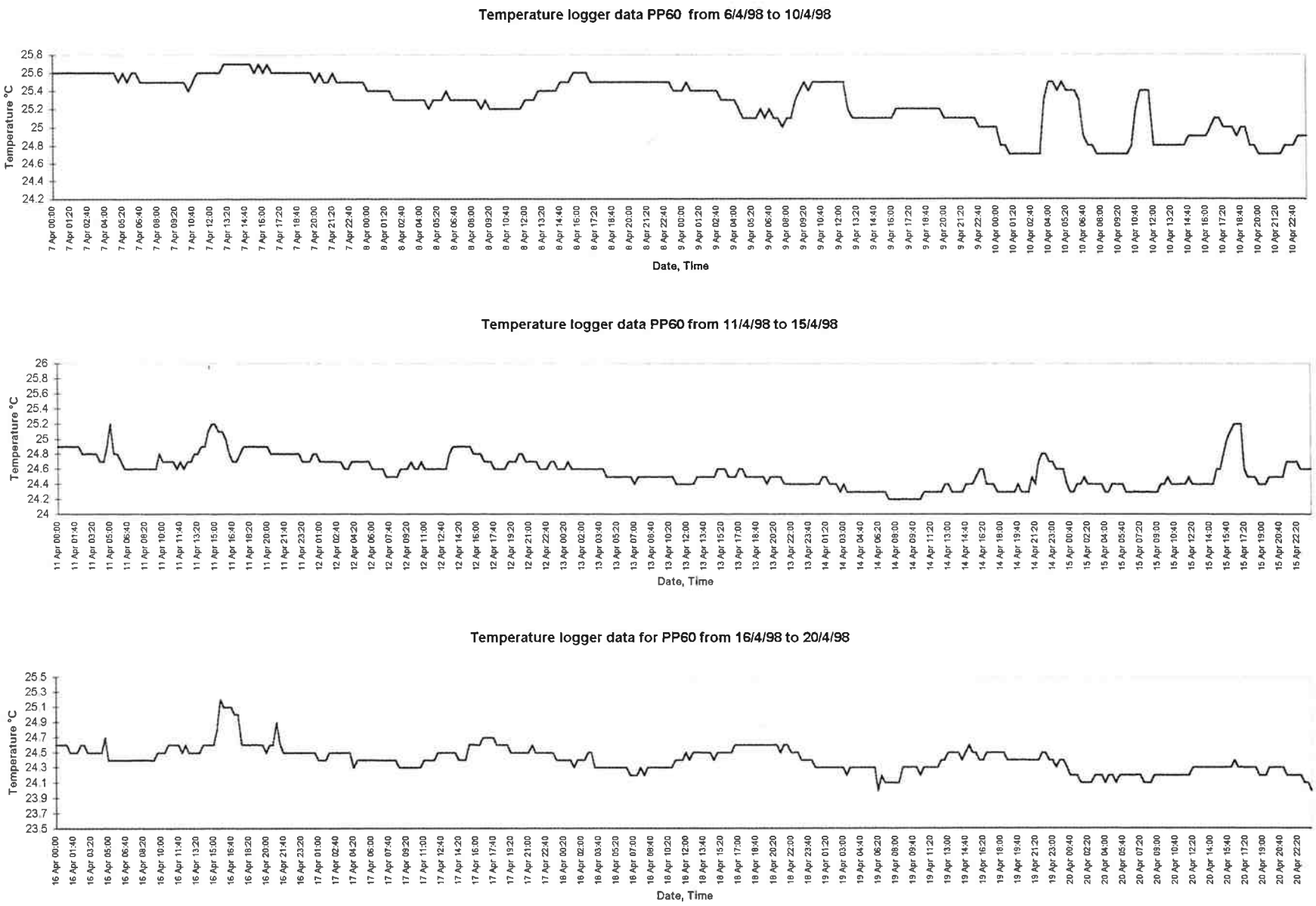


Figure 38 continued

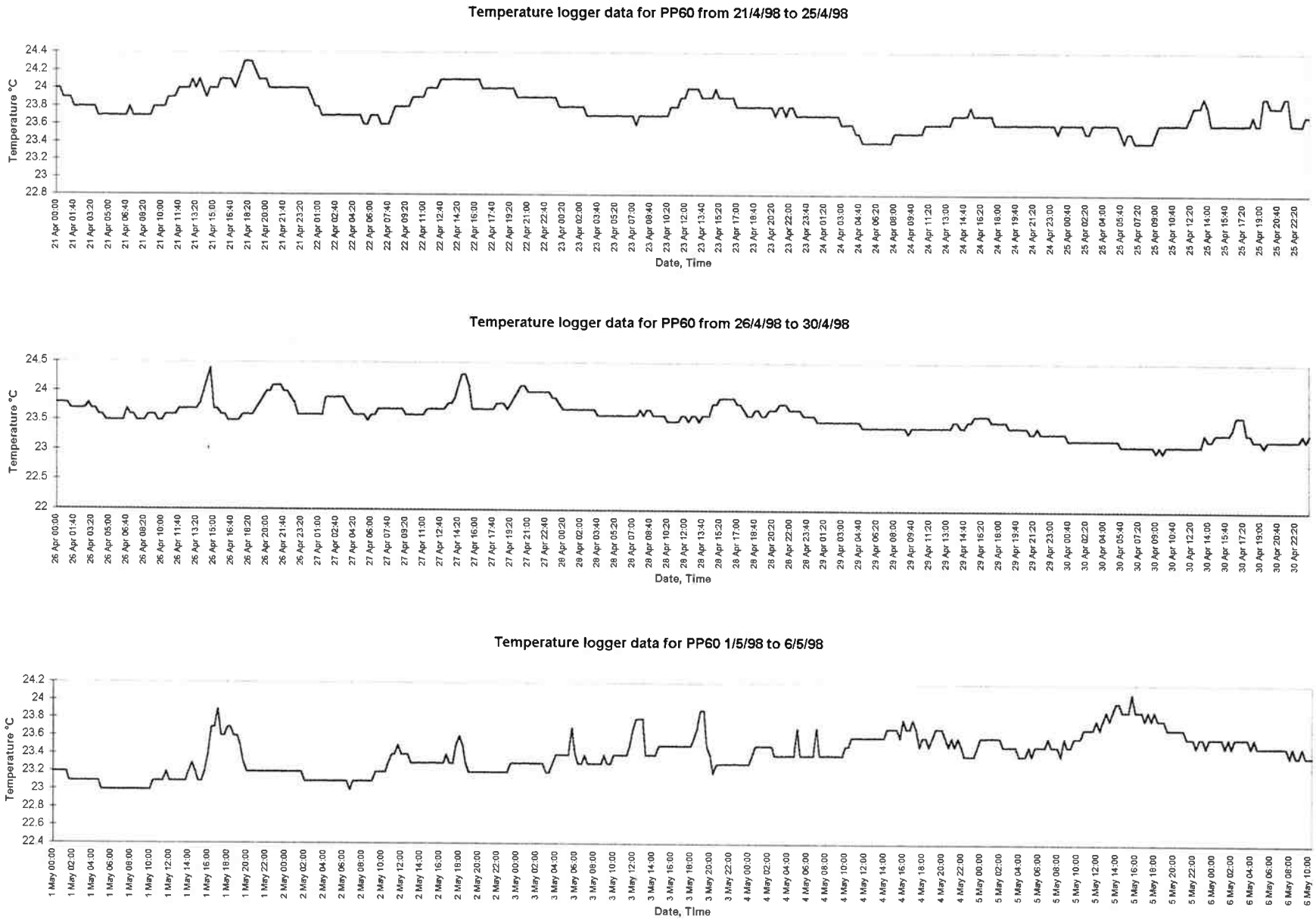


Figure 38 continued

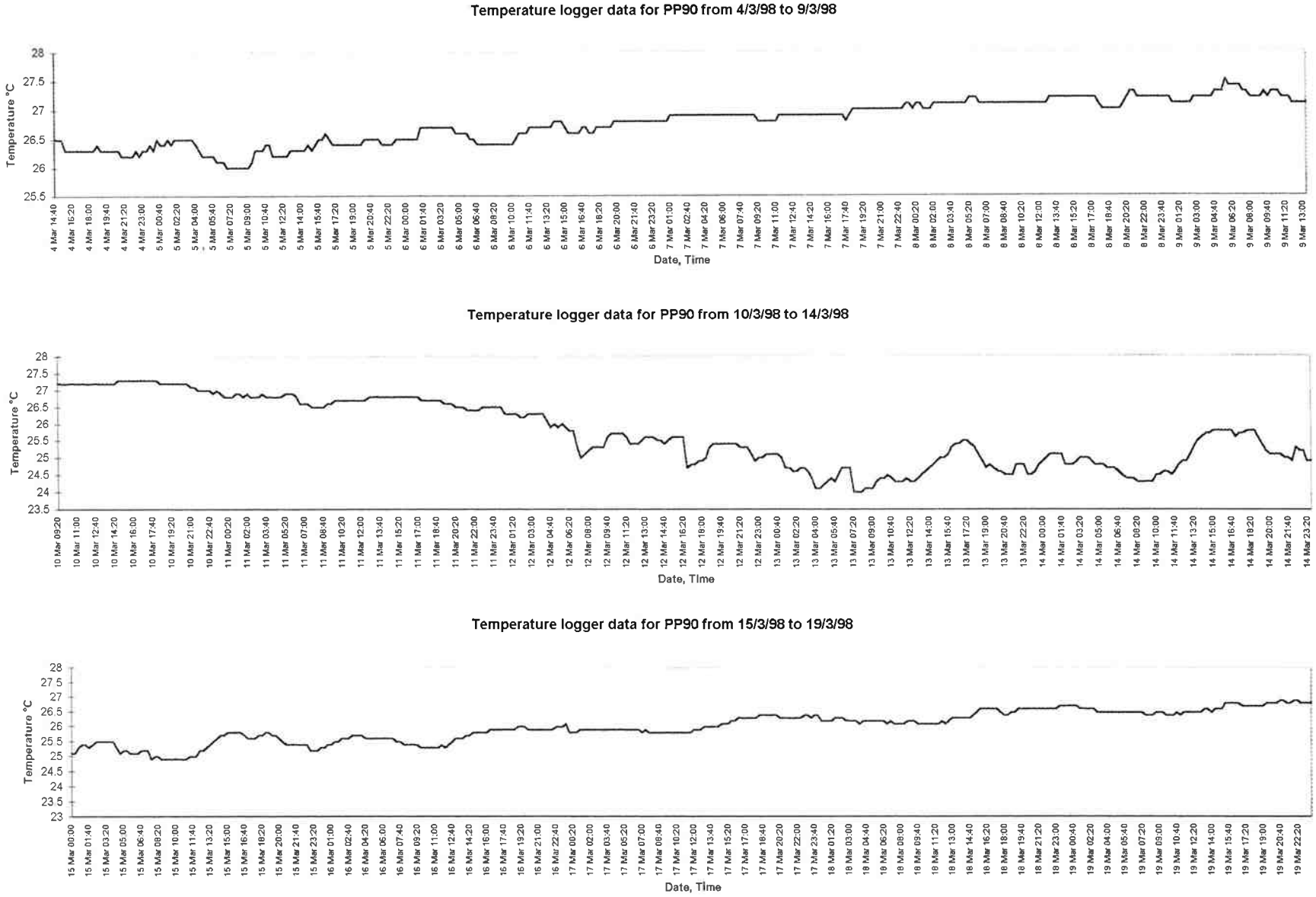


Figure 39 Temperature logger data for PP90 from 4/3/98 to 6/5/98 located 1m from the bottom

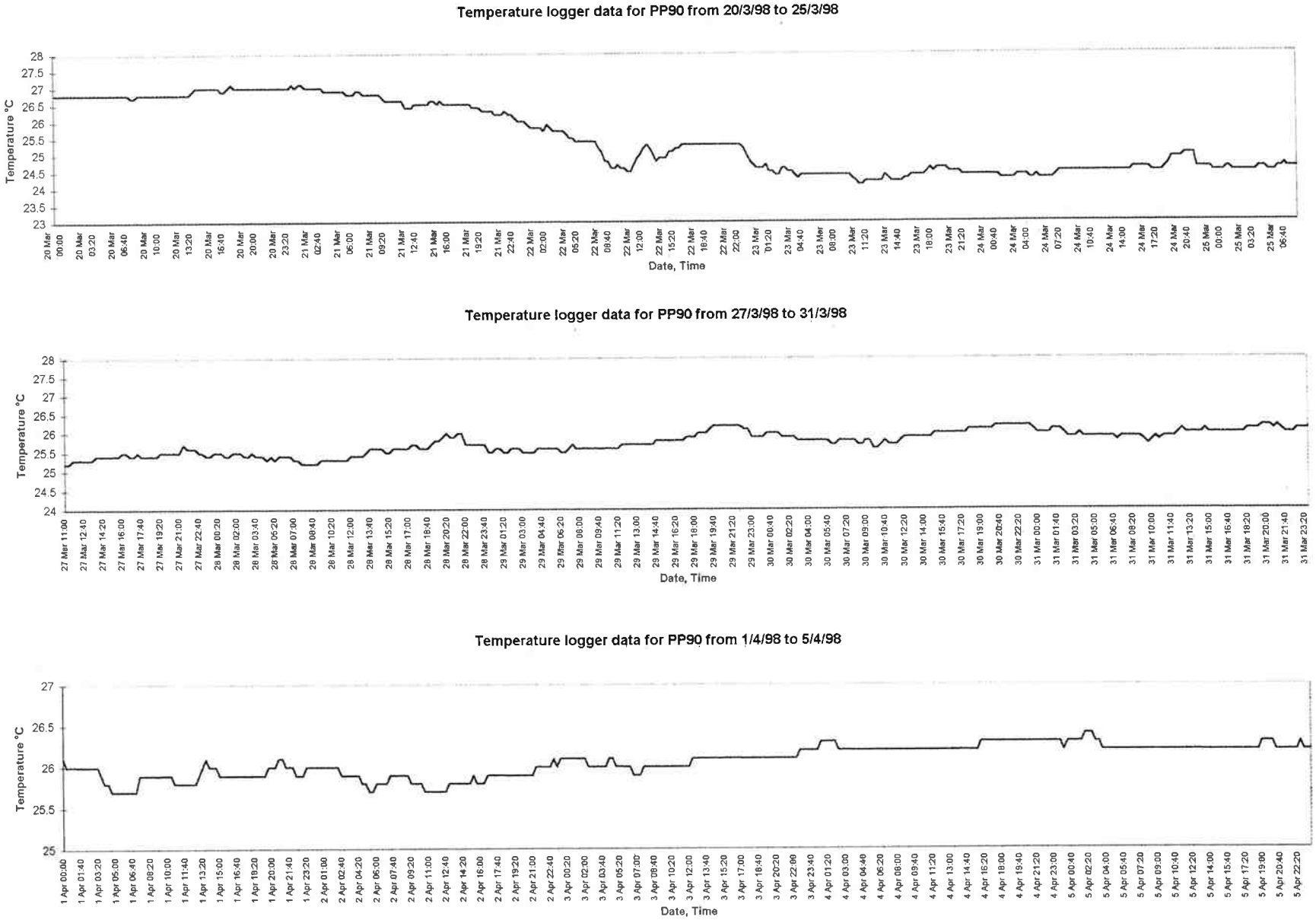


Figure 39 continued

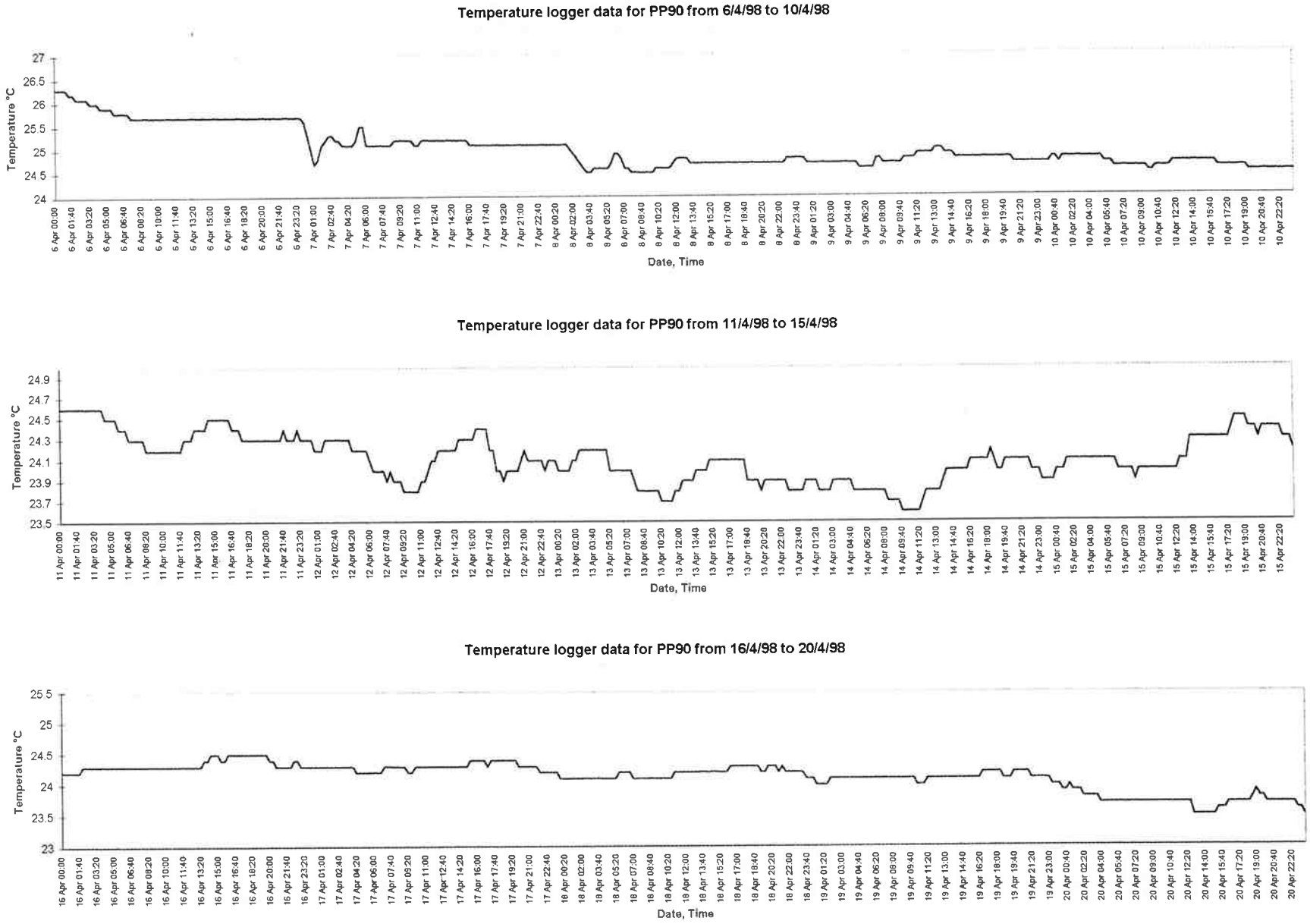


Figure 39 continued

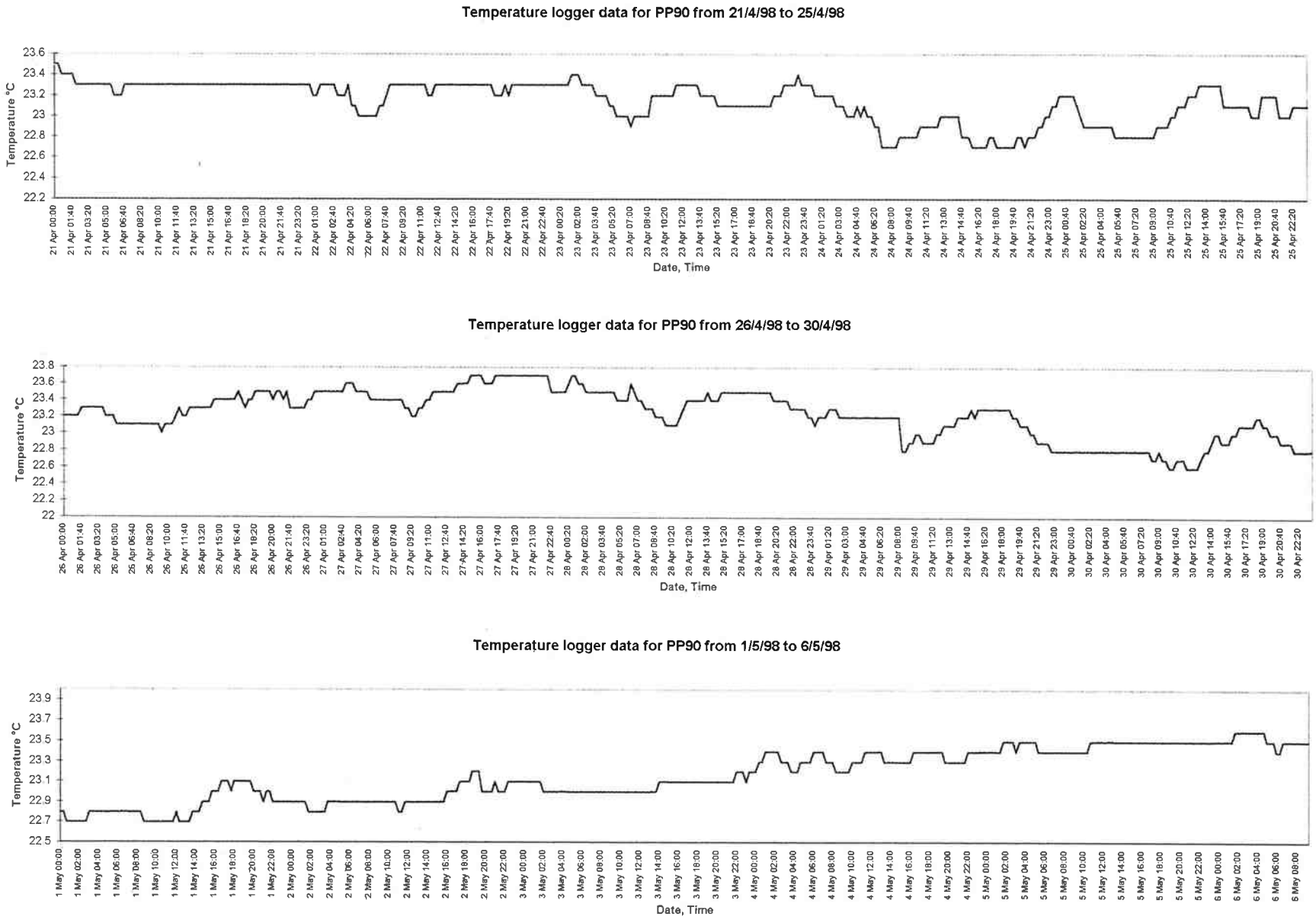


Figure 39 continued

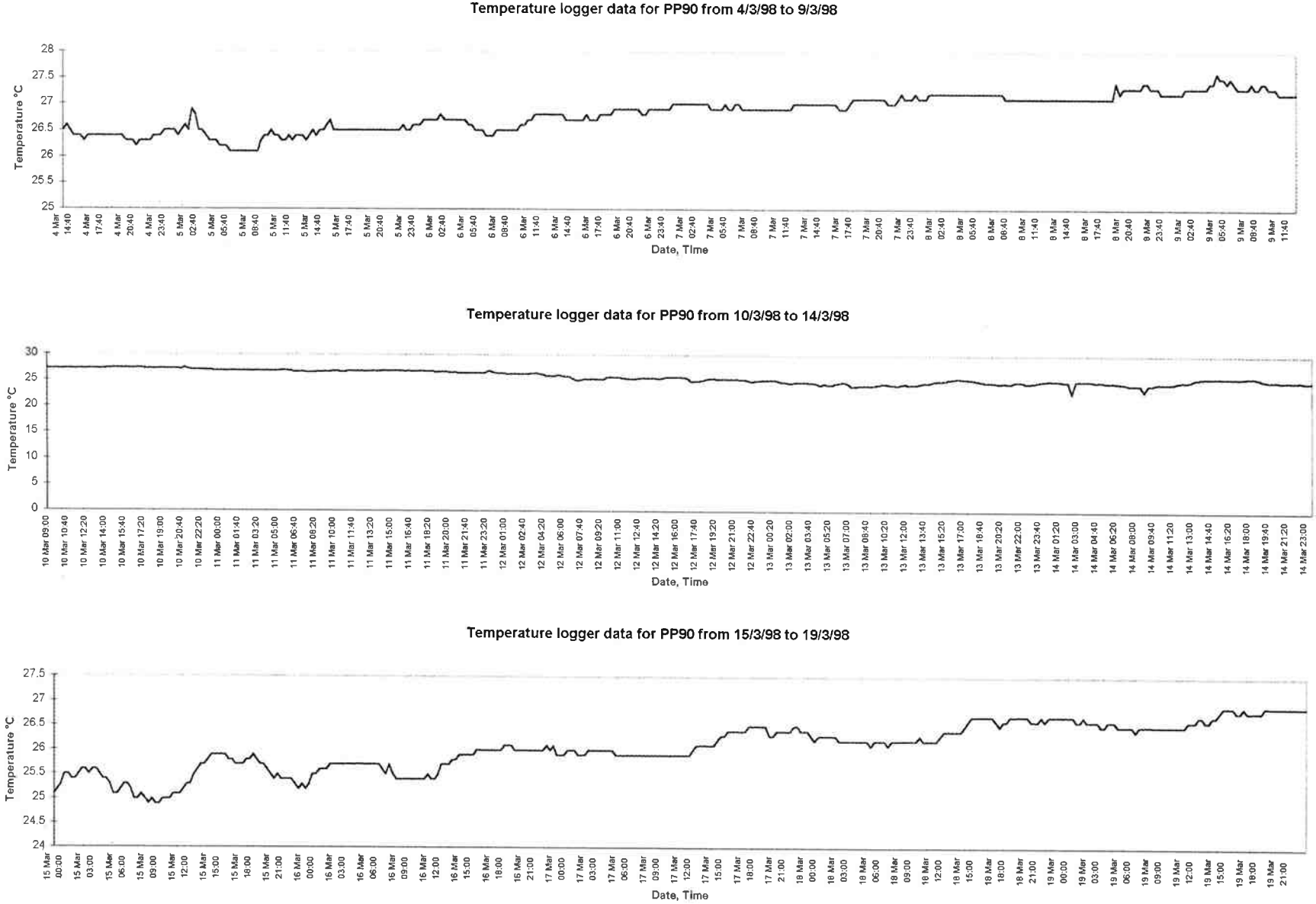


Figure 40 Temperature logger data for PP90 from 4/3/98 to 6/5/98 located 4m from the bottom

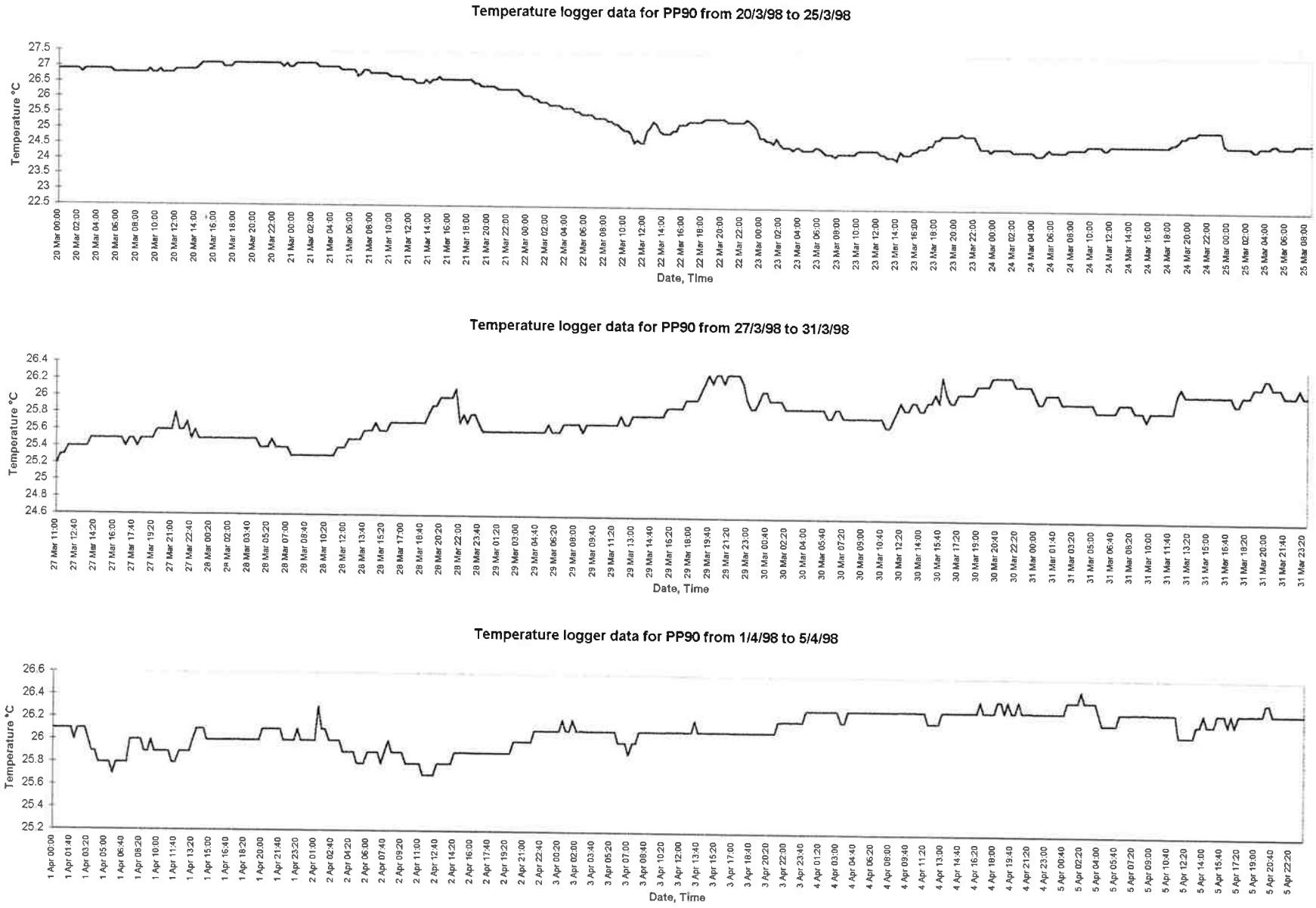


Figure 40 continued

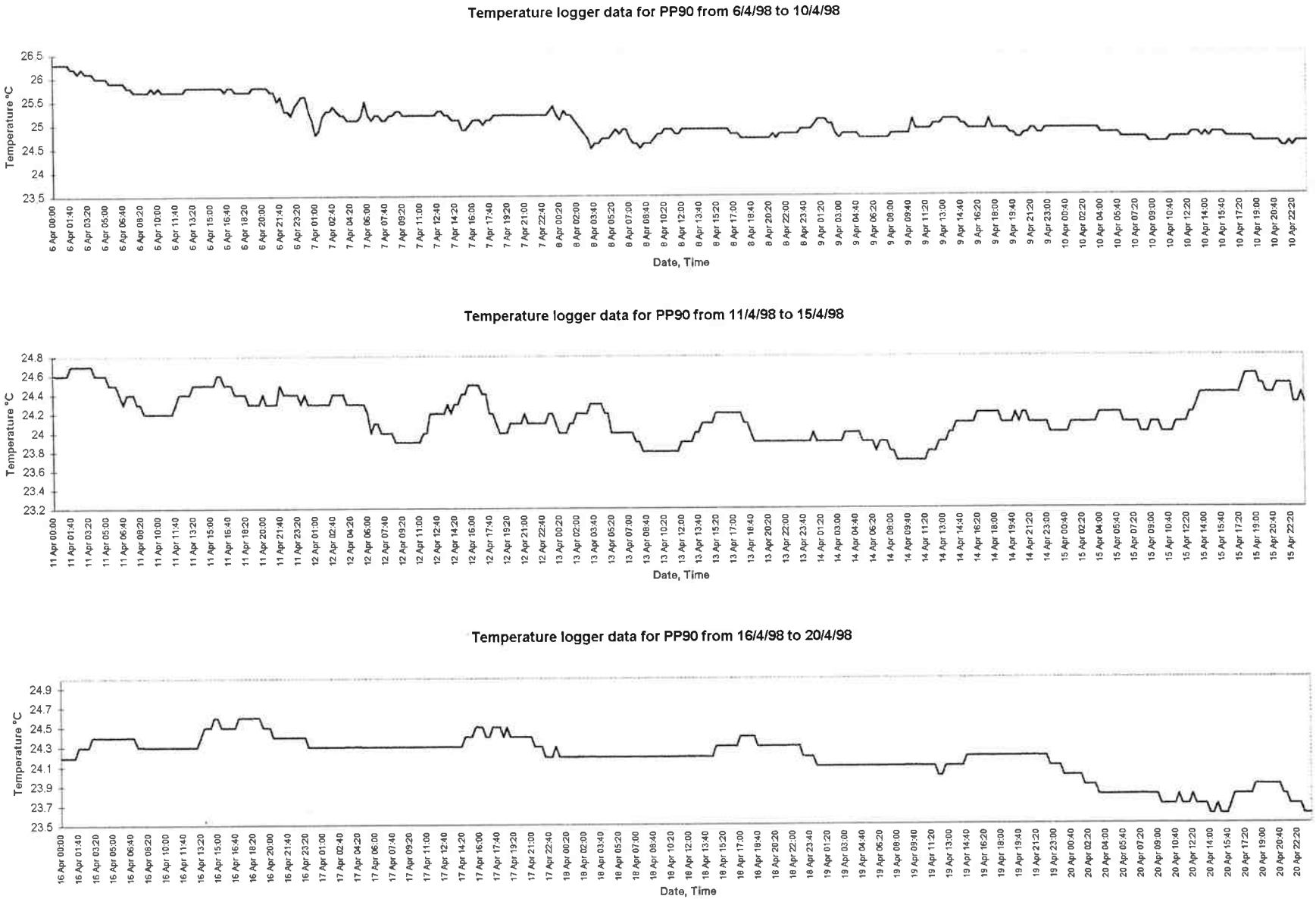


Figure 40 continued

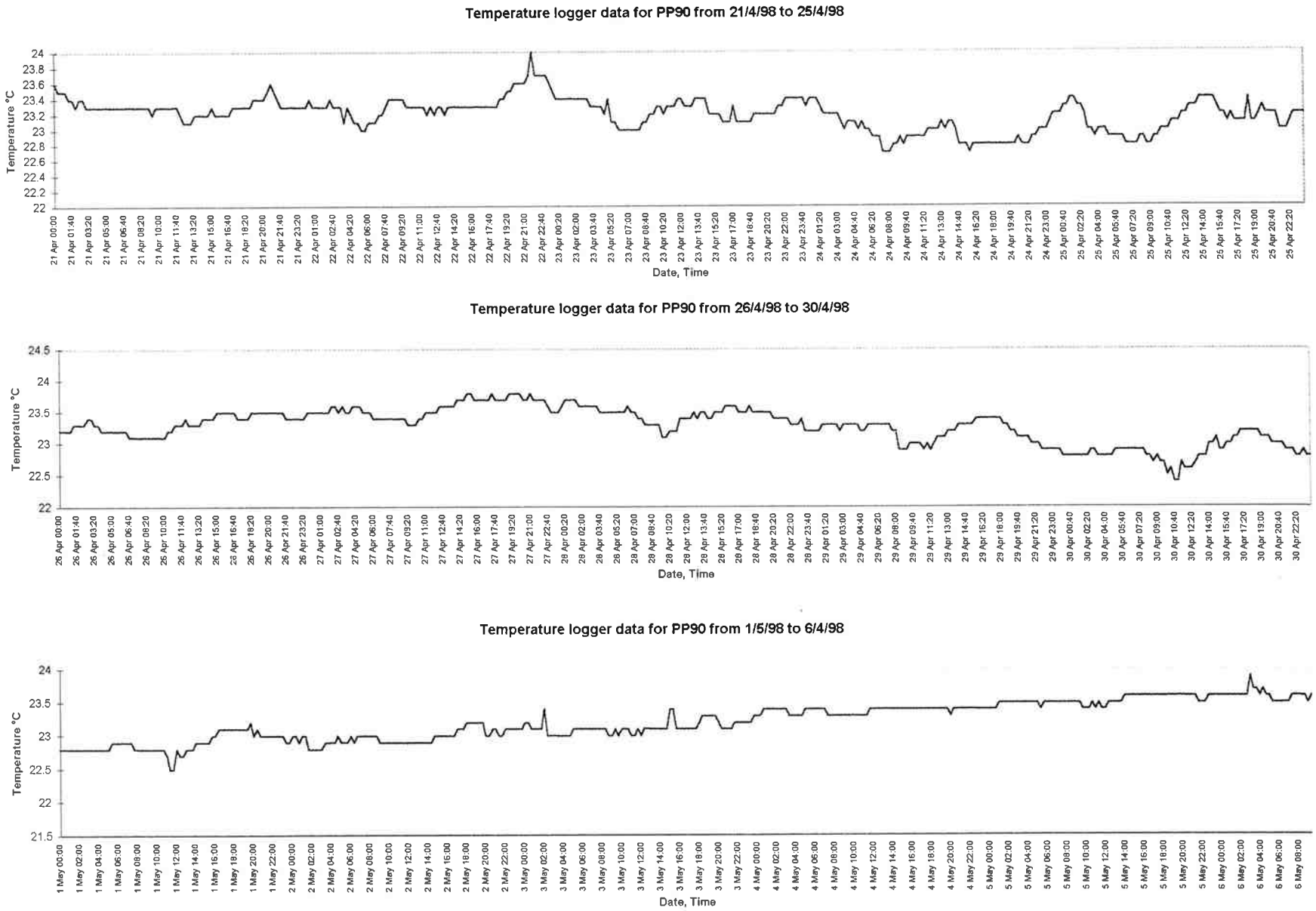


Figure 40 continued

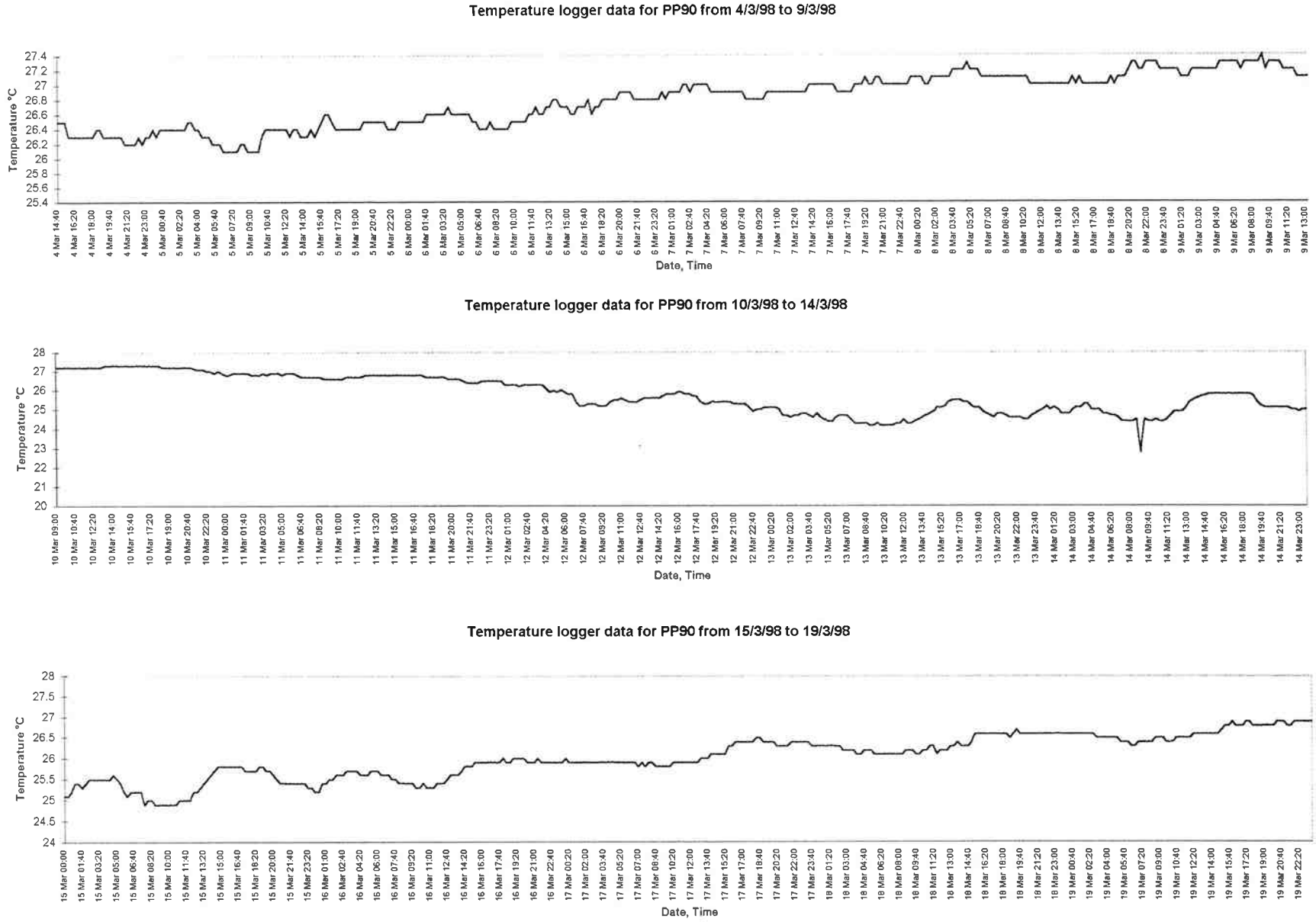


Figure 41 Temperature logger data for PP90 from 4/3/98 to 6/5/98 located 7m from the bottom

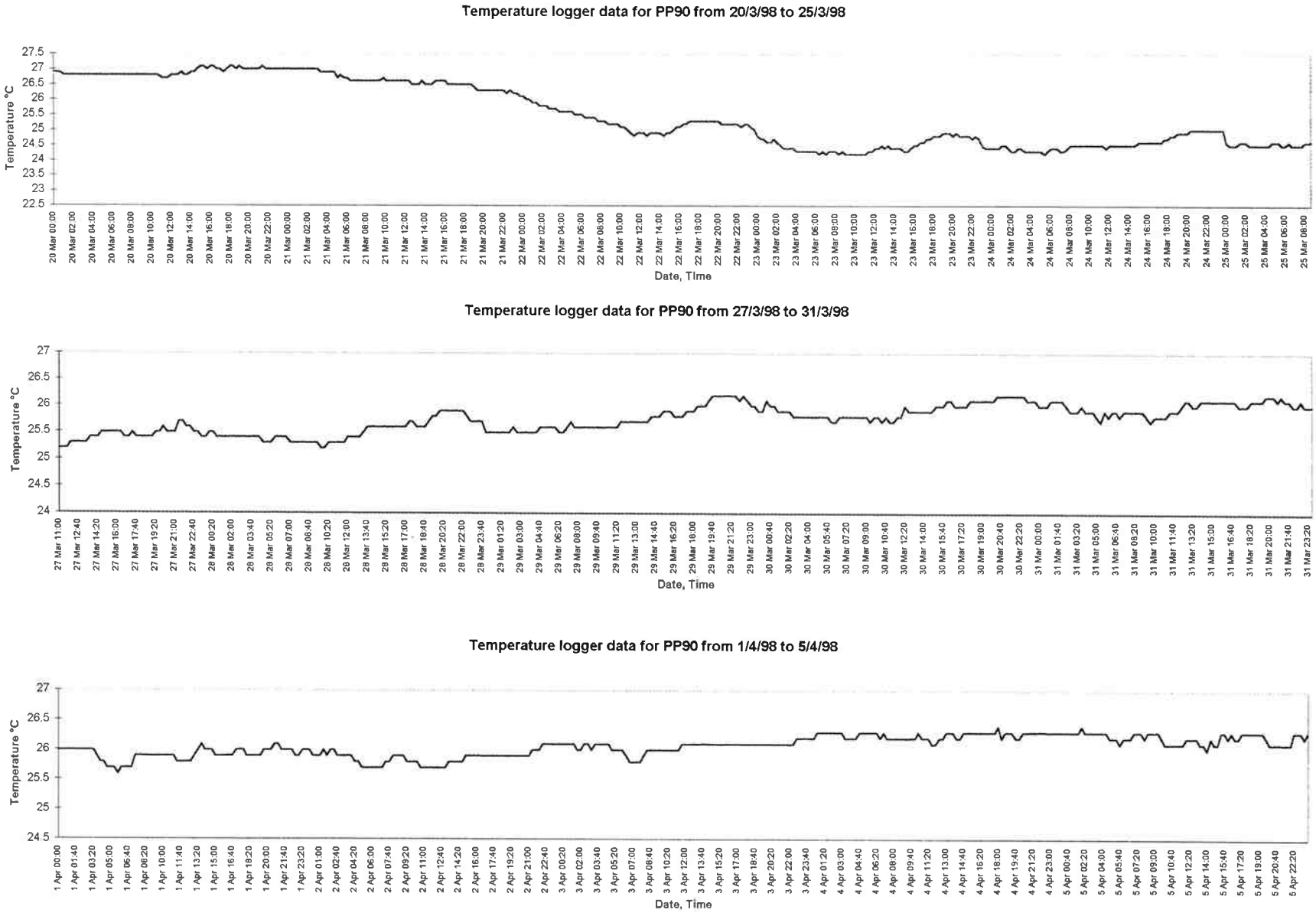


Figure 41 continued

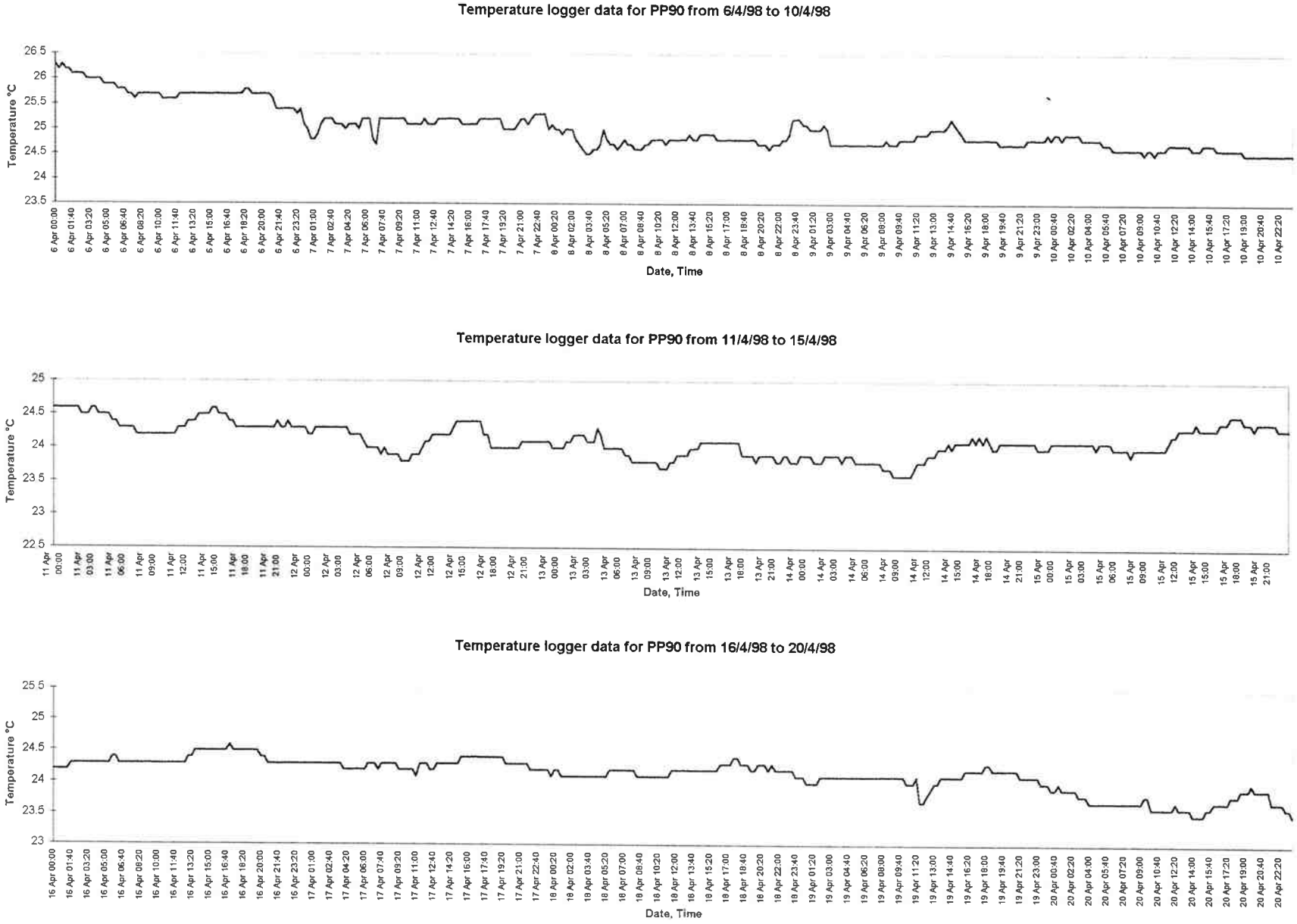


Figure 41 continued

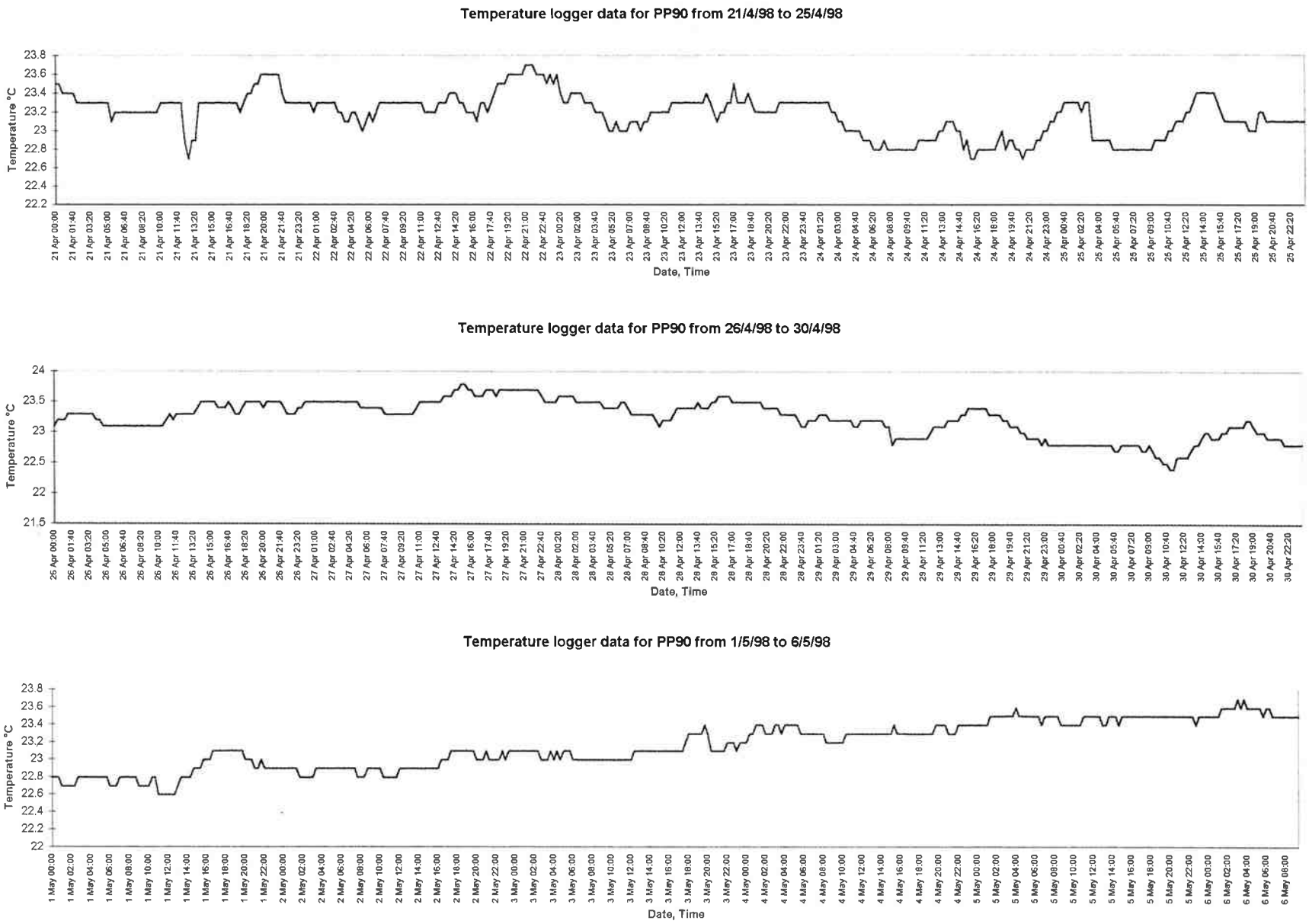


Figure 41 continued

APPENDIX 1

Nutrient Data

Table 5 Nutrient results for PP10 from 7/3/98 to 5/5/98

Sample Code	Sample Code	Date	Ammonia µg.N./L	NO3+NO2 µg.N./L	Total Inorganic-N µg.N./L	Total-N µg.N./L	Ortho-P µg.P./L	Total-P µg.P./L	Organic-P µg.P./L	Organic-N µg.N./L	Chloro 'a' µg/L	Chloro 'b' µg/L	Chloro 'c' µg/L	TSS mg/L
	Detection Limit		<3	<2		<60	<2	<10	<10	<60	<0.1	<0.1	<0.1	
PP10	980007	7/03/98	12	6	18	214	2	13	11	196	0.8	<0.1	<0.1	1.9
PP10	980031	10/03/98	9	5	14	188	3	20	16	174	1.9	0.1	0.3	3.5
PP10	980047	16/03/98	8	2	10	245	2	12	10	235	1.4	<0.1	0.3	
PP10	980059	25/03/98	15	9	24	262	3	15	12	238	1	<0.1	<0.1	
PP10	980071	31/03/98	11	7	18	167	3	17	13	149	0.8	0.1	<0.1	
PP10	980083	9/04/98	11	8	19	167	3	19	16	148	1.1	0.1	0.2	
PP10	980095	15/04/98	31	21	52	261	3	15	11	209	0.9	<0.1	<0.1	
PP10	980107	21/04/98	40	28	68	208	5	15	10	140	1	<0.1	0.1	
PP10	980119	28/04/98	16	10	26	236	5	17	12	210	0.8	<0.1	<0.1	
PP10	980129	5/05/98	9	11	20	228	4	16	11	208	1.1	<0.1	<0.1	

Table 6 Nutrient results for PP20 (Top) from 5/3/98 to 5/5/98

Sample Code	Sample Code	Date	Ammonia µg.N./L	NO3+NO2 µg.N./L	Total Inorganic-N µg.N./L	Total-N µg.N./L	Ortho-P µg.P./L	Total-P µg.P./L	Organic-P µg.P./L	Organic-N µg.N./L	Chloro 'a' µg/L	Chloro 'b' µg/L	Chloro 'c' µg/L	TSS mg/L
	Detection Limit		<3	<2		<60	<2	<10	<10	<60	<0.1	<0.1	<0.1	
PP20T	980004	5/03/98	19	4	23	304	3	11	<10	281	0.4	<0.1	<0.1	2.1
PP20T	980009	7/03/98	13	4	17	285	2	17	15	268	0.7	<0.1	<0.1	2
PP20T	980020	9/03/98	11	5	16	228	4	16	12	212	1.1	0.1	0.2	3.5
PP20T	980026	10/03/98	15	5	20	188	3	11	8	168	1.8	0.2	0.3	3.7
PP20T	980041	13/03/98	12	4	16	185	3	15	12	169	1.4	0.1	0.2	3.9
PP20T	980045	14/03/98	7	8	15	301	2	11	<10	286	1.1	<0.1	0.3	
PP20T	980048	16/03/98	8	6	14	219	2	13	11	205	1.1	<0.1	0.4	
PP20T	980060	25/03/98	13	5	18	227	2	13	11	209	0.5	<0.1	<0.1	
PP20T	980072	31/03/98	10	5	15	145	3	14	10	130	0.4	<0.1	<0.1	
PP20T	980084	9/04/98	8	7	15	135	3	22	19	120	0.7	0.1	0.1	
PP20T	980096	15/04/98	15	9	24	131	3	13	10	107	0.8	<0.1	<0.1	
PP20T	980108	21/04/98	11	3	14	174	3	14	11	160	0.8	<0.1	0.1	
PP20T	980120	28/04/98	5	6	11	242	4	17	13	231	1.7	0.1	0.1	
PP20T	980130	5/05/98	7	8	15	186	4	19	15	171	0.7	<0.1	0.1	

Table 7 Nutrient results for PP20 (Bottom) from 5/3/98 to 5/5/98

Sample Code	Sample Code Detection Limit	Date	Ammonia µg.N./L <3	NO3+NO2 µg.N./L <2	Total Inorganic-N µg.N./L	Total-N µg.N./L <60	Ortho-P µg.P./L <2	Total-P µg.P./L <10	Organic-P µg.P./L <10	Organic-N µg.N./L <60	Chloro 'a' µg/L <0.1	Chloro 'b' µg/L <0.1	Chloro 'c' µg/L <0.1	TSS mg/L
PP20B	980003	5/03/98	12	2	14	238	2	15	224	13	1.3	0.3	0.1	2.1
PP20B	980008	7/03/98	25	4	29	359	2	20	330	18	1.9	0.1	0.2	4.3
PP20B	980019	9/03/98	11	4	15	197	3	15	182	12	1.8	0.1	0.3	3.3
PP20B	980025	10/03/98	12	5	17	188	3	16	171	12	2	0.2	0.4	4
PP20B	*** 980040 ***	13/03/98	**14**	**3**	**17**	**206**	**3**	**14**	**189**	**11**	**4.7**	**0.2**	**0.8**	**9.3**
PP20B	980046	14/03/98	8	6	14	289	2	13	275	11	1.3	<0.1	0.3	
PP20B	980049	16/03/98	8	5	13	278	3	13	265	10	1.5	0.1	0.4	
PP20B	980061	25/03/98	13	8	21	312	3	24	291	21	1.7	0.1	0.2	
PP20B	980073	31/03/98	13	7	20	198	3	14	178	11	0.5	<0.1	0.1	
PP20B	980085	9/04/98	15	7	22	156	3	20	134	16	0.6	0.1	0.1	
PP20B	980097	15/04/98	22	18	40	189	3	17	149	14	1.6	<0.1	<0.1	
PP20B	980109	21/04/98	16	6	22	298	3	18	276	14	0.9	0.1	0.1	
PP20B	980121	28/04/98	5	7	12	339	4	23	327	19	1.9	0.1	0.2	
PP20B	980131	5/05/98	15	17	32	215	4	21	183	17	0.8	<0.1	0.1	

* indicates volume of filtered water was not recorded

Table 8 Nutrient results for PP30 from 9/3/98 to 5/5/98

Sample Code	Sample Code Detection Limit	Date	Ammonia µg.N./L <3	NO3+NO2 µg.N./L <2	Total Inorganic-N µg.N./L	Total-N µg.N./L <60	Ortho-P µg.P./L <2	Total-P µg.P./L <10	Organic-P µg.P./L <10	Organic-N µg.N./L <60	Chloro 'a' µg/L <0.1	Chloro 'b' µg/L <0.1	Chloro 'c' µg/L <0.1	TSS mg/L
PP30	980042	14/03/98	7	5	12	246	2	14	12	258	1.1	0.1	0.3	
PP30	980050	16/03/98	10	8	18	283	<2	12	10	301	1.4	0.1	0.4	
PP30	980062	25/03/98	11	6	17	252	3	15	11	269	0.8	<0.1	<0.1	
PP30	980074	31/03/98	10	6	16	140	6	24	18	156	0.7	<0.1	<0.1	
PP30	980086	9/04/98	8	4	12	151	3	19	16	163	0.8	0.1	0.1	
PP30	980098	15/04/98	11	6	17	150	3	17	14	167	1.1	<0.1	<0.1	
PP30	980110	21/04/98	22	14	36	129	3	18	15	165	0.8	0.1	<0.1	
PP30	980122	28/04/98	10	12	22	245	5	27	22	267	1.4	0.1	0.2	
PP30	980132	5/05/02	10	7	17	140	4	22	18	157	0.9	<0.1	<0.1	

Table 9 Nutrient results for PP40 from 7/3/98 to 5/5/98

Sample Code	Sample Code	Date	Ammonia µg.N./L	NO3+NO2 µg.N./L	Total Inorganic-N µg.N./L	Total-N µg.N./L	Ortho-P µg.P./L	Total-P µg.P./L	Organic-P µg.P./L	Organic-N µg.N./L	Chloro 'a' µg/L	Chloro 'b' µg/L	Chloro 'c' µg/L	TSS mg/L
	Detection Limit		<3	<2		<60	<2	<10	<10	<60	<0.1	<0.1	<0,1	
PP40	980011	7/03/98	18	5	23	415	2	17	15	392	0.9	<0.1	<0.1	2.9
PP40	980032	14/03/98	11	4	15	347	2	17	15	332	1.4	0.1	0.4	
PP40	980051	16/03/98	7	10	17	243	2	12	10	226	1.9	0.1	0.5	
PP40	980063	25/03/98	15	7	22	239	4	13	<10	217	1.3	<0.1	0.1	
PP40	980075	30/03/98	9	5	14	122	3	17	14	108	1	0.2	0.2	
PP40	980087	9/04/98	14	5	19	112	3	20	16	93	1	0.2	0.2	
PP40	980099	15/04/98	12	6	18	177	3	19	16	159	0.9	<0.1	<0.1	
PP40	980111	21/04/98	22	14	36	204	3	16	13	168	1.1	0.1	0.1	
PP40	980133	5/05/98	3	5	8	155	4	18	14	147	1.2	<0.1	<0.1	

Table 10 Nutrient results for PP50 from 7/3/98 to 5/5/98

Sample Code	Sample Code	Date	Ammonia µg.N./L	NO3+NO2 µg.N./L	Total Inorganic-N µg.N./L	Total-N µg.N./L	Ortho-P µg.P./L	Total-P µg.P./L	Organic-P µg.P./L	Organic-N µg.N./L	Chloro 'a' µg/L	Chloro 'b' µg/L	Chloro 'c' µg/L	TSS mg/L
	Detection Limit		<3	<2		<60	<2	<10	<10	<60	<0.1	<0.1	<0,1	
PP50	980012	7/03/98	13	5	18	378	2	16	14	360	1	<0.1	<0.1	2.9
PP50	980033	10/03/98	10	2	12	166	3	17	13	154	1.4	0.1	0.3	1.8
PP50	980052	16/03/98	6	7	13	200	2	14	12	187	1.9	<0.1	0.4	
PP50	980064	25/03/98	11	6	17	279	3	22	19	262	1.6	<0.1	0.1	
PP50	980076	31/03/98	8	6	14	207	3	20	17	193	0.8	<0.1	0.1	
PP50	980088	9/04/98	22	6	28	188	4	19	15	160	1.4	0.1	0.1	
PP50	980100	15/04/98	11	8	19	169	3	14	11	150	1.4	0.1	<0.1	
PP50	980112	21/04/98	19	8	27	228	2	16	14	201	1.1	0.1	0.1	
PP50	980134	5/05/98	10	7	17	205	4	18	14	188	1.4	<0.1	<0.1	

Table 11 Nutrient results for PP60 (Top) from 5/3/98 to 5/5/98

Sample Code	Sample Code Detection Limit	Date	Ammonia µg.N./L <3	NO3+NO2 µg.N./L <2	Total Inorganic-N µg.N./L	Total-N µg.N./L <60	Ortho-P µg.P./L <2	Total-P µg.P./L <10	Organic-P µg.P./L <10	Organic-N µg.N./L <60	Chloro 'a' µg/L <0.1	Chloro 'b' µg/L <0.1	Chloro 'c' µg/L <0.1	TSS mg/L
PP60T	980006	5/03/98	23	8	31	253	3	14	10	222	0.9	<0.1	0.1	10.7
PP60T	980014	7/03/98	13	2	15	183	2	15	13	168	0.9	<0.1	0.1	1
PP60T	980022	9/03/98	11	3	14	176	3	14	11	162	0.7	0.1	0.1	2
PP60T	980028	10/03/98	10	7	17	171	3	13	10	154	1	0.1	0.2	1.8
PP60T	980039	14/03/98	15	18	33	281	2	15	13	248	1.4	0.1	0.3	
PP60T	980053	16/03/98	7	3	10	226	2	10	<10	216	0.9	<0.1	0.3	
PP60T	980065	25/03/98	10	5	15	247	3	18	15	232	0.6	<0.1	0.1	
PP60T	980077	30/03/98	8	5	13	133	3	17	14	120	0.5	0.1	0.1	
PP60T	980090	9/04/98	9	4	13	224	3	14	11	211	1.2	0.1	<0.1	
PP60T	980101	15/04/98	12	3	15	115	3	13	10	100	1.1	<0.1	<0.1	
PP60T	980113	21/04/98	24	7	31	227	2	14	12	196	0.9	<0.1	0.1	
PP60T	980123	28/04/98	12	12	24	238	3	20	17	214	1.1	<0.1	0.1	
PP60T	980135	5/05/98	11	8	19	167	4	20	16	148	0.8	<0.1	0.1	

Table 12 Nutrient results for PP60 (Bottom) from 5/3/98 to 5/5/98

Sample Code	Sample Code Detection Limit	Date	Ammonia µg.N./L <3	NO3+NO2 µg.N./L <2	Total Inorganic-N µg.N./L	Total-N µg.N./L <60	Ortho-P µg.P./L <2	Total-P µg.P./L <10	Organic-P µg.P./L <10	Organic-N µg.N./L <60	Chloro 'a' µg/L <0.1	Chloro 'b' µg/L <0.1	Chloro 'c' µg/L <0.1	TSS mg/L
PP60B	980005	5/03/98	15	6	21	269	6	25	19	248	1.4	<0.1	0.1	12
PP60B	980013	7/03/98	8	4	12	194	2	12	10	182	1.2	<0.1	0.1	2.9
PP60B	980021	9/03/98	13	3	16	226	3	15	11	210	1.5	0.2	0.2	2.1
PP60B	980027	10/03/98	17	4	21	207	3	12	8	186	1.7	0.1	0.3	2.6
PP60B	980038	14/03/98	7	6	13	269	2	19	17	256	1.4	<0.1	0.3	
PP60B	980054	16/03/98	11	6	17	279	2	15	13	262	2.6	0.1	0.5	
PP60B	980066	25/03/98	12	6	18	300	3	14	11	282	1.4	<0.1	0.1	
PP60B	980078	30/03/98	11	6	17	229	4	21	17	212	1.4	0.2	0.2	
PP60B	980089	9/04/98	9	5	14	167	3	13	<10	153	0.7	<0.1	<0.1	
PP60B	980102	15/04/98	24	7	31	187	2	12	10	156	1.1	<0.1	0.1	
PP60B	980114	21/04/98	33	14	47	234	3	15	12	187	0.8	<0.1	0.1	
PP60B	980124	28/04/98	10	11	21	276	4	16	12	255	1.3	<0.1	0.1	
PP60B	980136	5/05/98	12	13	25	239	5	22	17	214	1.5	0.1	0.3	

Table 13 Nutrient results for PP70 from 7/3/98 to 5/5/98

Sample Code	Sample Code Detection Limit	Date	Ammonia µg.N./L <3	NO3+NO2 µg.N./L <2	Total Inorganic-N µg.N./L	Total-N µg.N./L <60	Ortho-P µg.P./L <2	Total-P µg.P./L <10	Organic-P µg.P./L <10	Organic-N µg.N./L <60	Chloro 'a' µg/L <0.1	Chloro 'b' µg/L <0.1	Chloro 'c' µg/L <0.1	TSS mg/L
PP70	980015	7/03/98	15	5	20	342	2	19	322	17	0.6	<0.1	<0.1	2.9
PP70	980034	10/03/98	10	5	15	169	3	13	154	10	1.3	0.1	0.2	1.8
PP70	980055	16/03/98	7	5	12	208	2	12	196	10	1.4	0.1	0.4	
PP70	980067	25/03/98	11	5	16	165	3	21	149	17	1.1	0.2	0.1	
PP70	980079	31/03/98	13	5	18	165	3	20	147	16	0.8	<0.1	0.1	
PP70	980091	9/04/98	12	5	17	133	3	21	116	17	1.4	0.2	0.2	
PP70	980103	15/04/98	22	12	34	183	4	15	149	11	1.5	<0.1	0.1	
PP70	980115	21/04/98	18	8	26	208	3	19	182	15	1.1	0.1	0.1	
PP70	980125	28/04/98	9	7	16	233	4	16	217	12	1.5	<0.1	0.2	
PP70	980137	5/05/98	14	11	25	199	4	20	174	16	0.7	<0.1	0.1	

Table 14 Nutrient results for PP80 from 7/3/98 to 5/5/98

Sample Code	Sample Code Detection Limit	Date	Ammonia µg.N./L <3	NO3+NO2 µg.N./L <2	Total Inorganic-N µg.N./L	Total-N µg.N./L <60	Ortho-P µg.P./L <2	Total-P µg.P./L <10	Organic-P µg.P./L <10	Organic-N µg.N./L <60	Chloro 'a' µg/L <0.1	Chloro 'b' µg/L <0.1	Chloro 'c' µg/L <0.1	TSS mg/L
PP80	980016	7/03/98	18	10	28	282	2	13	11	254	0.8	<0.1	<0.1	2.6
PP80	980035	10/03/98	17	10	27	223	3	12	9	196	1.4	0.1	0.2	2
PP80	980056	16/03/98	8	11	19	214	2	15	13	195	1.1	<0.1	0.2	
PP80	980068	25/03/98	16	9	25	272	3	19	16	247	0.9	0.1	<0.1	
PP80	980080	30/03/98	13	11	24	213	4	16	12	189	0.8	0.1	0.1	
PP80	980092	9/04/98	19	18	37	243	3	14	10	206	0.6	<0.1	<0.1	
PP80	980104	15/04/98	26	19	45	190	3	14	11	145	0.6	<0.1	<0.1	
PP80	980116	21/04/98	28	17	45	256	3	16	13	211	0.6	<0.1	0.1	
PP80	980126	28/04/98	14	18	32	283	4	16	12	251	0.8	<0.1	<0.1	
PP80	980138	5/05/98	10	12	22	247	5	17	12	225	0.8	<0.1	<0.1	

Table 15 Nutrient results for PP90 (Top) from 5/3/98 to 5/5/98

Sample Code	Sample Code	Date	Ammonia µg.N./L	NO3+NO2 µg.N./L	Total Inorganic-N µg.N./L	Total-N µg.N./L	Ortho-P µg.P./L	Total-P µg.P./L	Organic-P µg.P./L	Organic-N µg.N./L	Chloro 'a' µg/L	Chloro 'b' µg/L	Chloro 'c' µg/L	TSS mg/L
	Detection Limit		<3	<2	µg.N./L	<60	<2	<10	<10	<60	<0.1	<0.1	<0.1	
PP90T	980002	5/03/98	16	22	38	203	4	13	<10	165	0.8	<0.1	0.1	19.5
PP90T	980018	7/03/98	27	9	36	245	3	14	11	209	0.5	<0.1	<0.1	18.5
PP90T	980024	9/03/98	18	5	23	198	3	10	7	175	0.8	<0.1	0.1	2
PP90T	980030	10/03/98	15	8	23	211	3	15	12	188	1.2	0.1	0.2	2.6
PP90T	980037	13/03/98	21	12	33	255	4	15	11	222	0.9	0.1	0.2	4.4
PP90T	980043	14/03/98	8	5	13	268	3	13	10	255	0.9	<0.1	0.2	
PP90T	980057	16/03/98	7	17	24	260	2	13	11	236	1	<0.1	0.2	
PP90T	980069	25/03/98	22	22	44	244	4	16	11	200	0.7	0.1	<0.1	
PP90T	980081	30/03/98	17	12	29	245	3	20	16	216	0.8	0.1	0.1	
PP90T	980094	9/04/98	18	13	31	243	4	<10	<10	212	0.6	<0.1	<0.1	
PP90T	980105	15/04/98	26	20	46	269	3	12	<10	223	0.6	<0.1	0.1	
PP90T	980117	21/04/98	22	15	37	254	2	16	14	217	0.7	<0.1	<0.1	
PP90T	980127	28/04/98	11	15	26	270	5	17	12	244	0.7	<0.1	0.2	
PP90T	980139	5/05/98	11	8	19	234	4	21	16	215	1.1	<0.1	0.1	

Table 16 Nutrient results for PP90 (Bottom) from 5/3/98 to 5/5/98

Sample Code	Sample Code	Date	Ammonia µg.N./L	NO3+NO2 µg.N./L	Total Inorganic-N µg.N./L	Total-N µg.N./L	Ortho-P µg.P./L	Total-P µg.P./L	Organic-P µg.P./L	Organic-N µg.N./L	Chloro 'a' µg/L	Chloro 'b' µg/L	Chloro 'c' µg/L	TSS mg/L
	Detection Limit		<3	<2		<60	<2	<10	<10	<60	<0.1	<0.1	<0.1	
PP90B	980001	5/03/98	38	25	63	254	4	21	17	191	0.9	<0.1	<0.1	19.7
PP90B	980017	7/03/98	27	7	34	353	2	13	11	319	1	0.1	0.1	3.9
PP90B	980023	9/03/98	13	3	16	196	3	10	7	180	1.7	0.1	0.3	2.8
PP90B	980029	10/03/98	19	13	32	216	3	12	9	184	1.1	0.1	0.2	1.2
PP90B	980036	13/03/98	23	9	32	292	3	14	10	260	0.9	0.1	0.1	4.9
PP90B	980044	14/03/98	16	10	26	383	2	11	<10	357	0.9	<0.1	0.2	
PP90B	980058	16/03/98	9	10	19	273	2	13	11	254	0.9	<0.1	0.2	
PP90B	980070	25/03/98	27	20	47	293	4	19	15	246	0.9	<0.1	0.1	
PP90B	980082	30/03/98	14	9	23	190	3	21	17	167	0.7	0.1	0.1	
PP90B	980093	9/04/98	23	12	35	213	3	15	12	178	0.8	<0.1	<0.1	
PP90B	980106	15/04/98	33	21	54	362	3	12	<10	308	0.5	<0.1	<0.1	
PP90B	980118	21/04/98	31	22	53	285	4	15	11	232	0.5	<0.1	0.1	
PP90B	980128	28/04/98	15	15	30	241	5	19	14	211	0.8	<0.1	<0.1	
PP90B	980140	5/05/98	13	14	27	249	4	19	15	222	0.9	<0.1	<0.1	

APPENDIX 2

Salinity and Temperature Profile Data

Table 17 Salinity and temperature data for PP10 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
07.03.98	1605	0	39.9		28.5	28.6		YP & KB
		0.5	39.95		28.2	28.3		
		1	40.1		27.6	27.7	Calibration information	
		2	40.1		27.5	27.6		
		3	40.1		27.3	27.4		
		4	40.1		27.3	27.4		
		5	40.1		27.3	27.4		
		6	40.1		26.7	26.8		
		7	40.1		26.7	26.8		
		7.5	40.1		26.7	26.8		
10.03.98	1235	0	40.6		27	27.1	Secchi = 1.5m	YP & KB
		0.5	40.6		27	27.1		
		1	40.6		27	27.1		
		2	40.6		27	27.1	Calibration information	
		3	40.6		27	27.1		
		4	40.6		27	27.1		
		5	40.6		27	27.1		
		6	40.6		27	27.1		
		7	40.6		27	27.1		
		7.5	40.6		27	27.1		
16.03.98	1455	0	40.35		26.4	26.5	Winds NW 7-8kn	YP & BB
		0.5	40.35		26.4	26.5		
		1	40.4		26.2	26.3		
		2	40.5		26	26.1	Calibration information	
		3	40.5		25.8	25.9		
		4	40.55		25.8	25.9		
		5	40.65		25.8	25.9		
		6	40.7		25.6	25.7		
		7	40.75		25.6	25.7		
		8	40.75		25.6	25.7		
25.03.98	1630	0	39.8		27.6	27.7	No wind	YP & IB
		0.5	40.15		26.4	26.5		
		1	40.5		25.5	25.6		
		2	40.6		25.3	25.4	Calibration information	
		3	40.6		25.1	25.2		
		4	40.6		25	25.1		
		5	40.8		24.9	25		
		6	41.05		24.9	25		
		7	41.2		24.9	25		
		7.2	41.2		24.9	25		
31.03.98	1515	0	38.5		27.1	27.2	Winds SE 1-2kn	YP & IB
		0.5	39.6		26.1	26.2		
		1	39.75		26.1	26.2		
		2	40.35		26.1	26.2	Calibration information	
		3	40.45		26.1	26.2		
		4	40.55		26.1	26.2		
		5	40.6		26.1	26.2		
		6	40.8		26.1	26.2		
		7	41.1		25.9	26		
		8	41.15		25.9	26		
		8.5	41.15		25.9	26		
08.04.98	1500	0	39.9		25.6	25.7	Winds SE 5-7kn	YP & IB
		0.5	39.9		25.6	25.7		
		1	39.9		25.6	25.7		
		2	39.9		25.2	25.3		
		3	40.1		25.1	25.2	Calibration information	
		4	40.3		24.9	25		
		5	40.3		24.9	25		
		6	40.3		24.9	25		
		7	40.3		24.9	25		
		7.5	40.3		24.9	25		
15.04.98	1420	0	40.1		25	25.1	Winds SW 10kn	YP & JD
		0.5	40.1		24.9	25		
		1	40.3		24.5	24.6		
		2	40.4		24.5	24.6	Calibration information	
		3	40.5		24.4	24.5		
		4	40.5		24.4	24.5		
		5	40.6		24.4	24.5		
		6	40.8		24.3	24.4		
		7	40.95		24.3	24.4		
		8	40.95		24.3	24.4		

Table 17 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
21.04.98	1530	0	40.6		24	24.1	Winds S 2kn	YP & IB
		0.5	40.6		24	24.1		
		1	40.6		24	24.1		
		2	40.7		23.7	23.8		
		3	40.9		23.6	23.7	Calibration information	
		4	41.1		23.6	23.7		
		5	41.25		23.7	23.8		
		6	41.35		23.6	23.7		
		7	42		23.6	23.7		
		7.5	42		23.6	23.7		
28.4.98	1415	0	40.7		23.6	23.7	Winds S 15kn	YP & IB
		0.5	40.7		23.6	23.7	Moderate current	
		1	40.7		23.6	23.7		
		2	40.7		23.6	23.7		
		3	40.7		23.6	23.7	Calibration information	
		4	40.7		23.6	23.7		
		5	40.7		23.6	23.7		
		6	40.7		23.6	23.7		
		7	40.7		23.6	23.7		
		8	40.7		23.6	23.7		
5.05.98	1345	0	40.7		23.8	23.9	Winds S 8Kn	YP & IB
		0.5	40.7		23.8	23.9		
		1	40.7		23.8	23.9		
		2	40.7		23.8	23.9	Calibration information	
		3	41.2		23.7	23.8		
		4	41.4		23.7	23.8		
		5	41.6		23.5	23.6		
		6	42		23.5	23.6		
		7	42		23.5	23.6		
		7.5	42		23.5	23.6		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 18 Salinity and temperature data for PP20 from 5/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
05.03.98	1445	0	39.75		28.6	28.7	Dead calm	YP & KB
		0.5	39.95		27.5	27.6		
		1	39.95		27	27.1		
		2	39.95		26.5	26.6	Calibration information	
		3	39.95		26.1	26.2		
		4	39.9		25.9	26		
		5	39.9		25.9	26		
		6	39.9		25.9	26		
		6.5	39.9		25.9	26		
07.03.98	1420	0	39.75		28	28.1	Hot, seat temp very hot	YP & KB
		0.5	39.9		27.7	27.8		
		1	39.9		27.5	27.6		
		2	39.9		27.1	27.2		
		3	40.3		26.5	26.6		
		4	40.4		26.5	26.6		
		5	40.4		26.5	26.6		
		6	40.4		26.5	26.6		
		7	40.4		26.5	26.6		
09.03.98	1150	0	40.5		27.1	27.2		YP & KB
		0.5	40.5		27.1	27.2		
		1	40.5		27.1	27.2	Calibration information	
		2	40.5		27	27.1		
		3	40.5		27	27.1		
		4	40.5		26.9	27		
		5	40.5		26.9	27		
		6	40.55		26.7	26.8		
		7	40.55		26.7	26.8		
10.03.98	1145	0	40.55		27	27.1	Wind picking up	YP & KB
		0.5	40.55		27	27.1	Secchi = 1.25m	
		1	40.55		27	27.1		
		2	40.55		27	27.1		
		3	40.55		27	27.1		
		4	40.55		27	27.1		
		5	40.55		27	27.1		
		6	40.55		27	27.1		
		6.5	40.55		27	27.1		
13.03.98	1045	0	41		25.5	25.6	Rough	YP & KB
		0.5	41		25.5	25.6		
		1	41		25.5	25.6		
		2	41		25.5	25.6	Calibration information	
		3	41		25.5	25.6		
		4	41		25.5	25.6		
		5	41		25.5	25.6		
		6	41.05		25.1	25.2		
		6.5	41.1		24.9	25		
14.03.98	1240	0	40.2		26	26.1		YP & CS
		0.5	40.2		26	26.1		
		1	40.25		25.7	25.8	Calibration information	
		2	40.25		25.8	25.9		
		3	40.25		25.6	25.7		
		4	40.3		25.5	25.6		
		5	40.4		24.4	24.5		
		6	40.7		24.4	24.5		
		7	40.8		24.4	24.5		
16.03.98	1420	0	39.6		26.4	26.5	Winds NW 7-8kn	YP & BB
		0.5	39.7		26.4	26.5		
		1	39.75		26.4	26.5		
		2	39.9		26.1	26.2		
		3	40		26.1	26.2		
		4	40		26.1	26.2		
		5	40.25		26	26.1		
		6	40.4		25.9	26		
		7	40.4		25.9	26		

Table 18 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
25.03.98	1455	0	39.5		27.1	27.2	No wind	YP & IB
		0.5	39.55		26.6	26.7		
		1	39.65		26.1	26.2		
		2	39.65		25.5	25.6		
		3	39.7		25.4	25.5		
		4	39.7		25	25.1		
		5	40.1		25	25.1		
		6	40.4		25	25.1		
		6.5	40.4		25	25.1		
31.03.98	1435	0	37.9		27	27.1	Winds SE 5kn	YP & IB
		0.5	37.9		26.8	26.9	Sunny and hot	
		1	37.9		25.7	25.8		
		2	38		25.5	25.6		
		3	38.35		25.5	25.6		
		4	38.4		25.5	25.6		
		5	38.5		25.5	25.6		
		6	38.6		25.5	25.6		
		7	39.4		26	26.1		
		7.5	39.5		26	26.1		
08.04.98	1330	0	39.15		24.9	25	Winds S SE 12-14kn	YP & IB
		0.5	39.15		24.9	25		
		1	39.15		24.9	25		
		2	39.15		24.9	25		
		3	39.15		24.9	25		
		4	39.2		24.9	25		
		5	39.3		24.9	25		
		6	39.4		24.9	25		
		6.5	39.45		24.9	25		
15.04.98	1330	0	39.4		25	25.1	Winds N 5kn	YP & JD
		0.5	39.4		25	25.1		
		1	39.4		25	25.1		
		2	39.5		24.5	24.6		
		3	39.65		24.5	24.6		
		4	39.75		24.4	24.5		
		5	40		24.4	24.5		
		6	40.1		24.4	24.5		
		7	40.1		24.4	24.5		
21.04.98	1355	0	40.1		24	24.1	Winds S 3-5kn	YP & IB
		0.5	40.1		24	24.1		
		1	40.1		24	24.1		
		2	40.1		24	24.1		
		3	40.1		23.9	24		
		4	40.2		23.9	24		
		5	40.25		23.9	24		
		6	40.3		23.6	23.7		
		6.5	40.3		23.6	23.7		
28.4.98	1235	0	40.3		23.6	23.7	Winds S 20kn	YP & IB
		0.5	40.3		23.6	23.7	Rough	
		1	40.3		23.6	23.7	Moderate current	
		2	40.3		23.6	23.7		
		3	40.3		23.6	23.7		
		4	40.3		23.6	23.7		
		5	40.3		23.6	23.7		
		6	40.3		23.6	23.7		
		7	40.3		23.6	23.7		
		7.5	40.3		23.6	23.7		
5.05.98	1225	0	39.85		23.7	23.8	Winds S 8Kn	YP & IB
		0.5	39.85		23.7	23.8	Moderate current	
		1	39.85		23.7	23.8		
		2	39.85		23.7	23.8		
		3	39.85		23.7	23.8		
		4	39.85		23.7	23.8		
		5	39.95		23.7	23.8		
		6	40.3		23.9	24		
		6.5	40.7		23.9	24		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 19 Salinity and temperature data for PP30 from 13/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
13.03.98	955	0	40.9		25.1	25.2	Rough	YP & KB
		0.5	40.85		25.1	25.2		
		1	40.85		25.1	25.2		
		2	40.85		25.1	25.2		
		3	40.85		25.1	25.2		
		4	40.85		25.1	25.2		
		5	40.85		25.1	25.2		
		6	40.85		25.1	25.2		
		7	40.85		25.1	25.2		
		8	40.85		25.1	25.2		
14.03.98	1020	0	39.9		25.5	25.6		YP & KB
		0.5	39.9		25.5	25.6		
		1	39.9		25.5	25.6		
		2	39.9		25.5	25.6		
		3	39.9		25.5	25.6		
		4	39.9		25.5	25.6		
		5	39.9		25.5	25.6		
		6	39.9		25.4	25.5		
		7	39.95		25.4	25.5		
		8	39.95		25.4	25.5		
		9	39.95		25.4	25.5		
		9.5	39.95		25.4	25.5		
16.03.98	1220	0	39		26.5	26.6	No wind under 5kn	YP & BB
		0.5	39.05		25.9	26		
		1	39.05		25.7	25.8		
		2	39.25		25.6	25.7		
		3	39.4		25.7	25.8		
		4	39.95		25.8	25.9		
		5	40		25.8	25.9		
		6	40		25.8	25.9		
		7	40		25.8	25.9		
		8	40		25.8	25.9		
		9	40		25.8	25.9		
		9.5	40		25.8	25.9		
25.03.98	1350	0	38.95		26.6	26.7	No wind	YP & IB
		0.5	39		26	26.1		
		1	39		25.5	25.6		
		2	39		25.1	25.2		
		3	39		25	25.1		
		4	39.1		24.9	25		
		5	39.2		24.8	24.9		
		6	39.35		24.8	24.9		
		7	39.45		24.8	24.9		
		8	39.8		24.9	25		
		9	39.85		24.9	25		
		9.5	39.85		24.9	25		
31.03.98	1235	0	37.8		26	26.1	Light breeze	YP & IB
		0.5	37.8		25.9	26	Strong current 1-2kn	
		1	37.85		25.5	25.6	Hot	
		2	38.25		25.3	25.4		
		3	38.4		25.2	25.3		
		4	38.45		25.2	25.3		
		5	38.5		25.1	25.2		
		6	38.5		25.1	25.2		
		7	38.8		25.1	25.2		
		8	39.85		25.1	25.2		
		9	39.9		25.4	25.5		
		10	39.9		25.4	25.5		
		10.5	39.9		25.4	25.5		
08.04.98	1240	0	38.75		25	25.1	Winds S 12kn	YP & IB
		0.5	38.75		24.9	25		
		1	38.75		24.9	25		
		2	38.75		24.9	25		
		3	38.75		24.9	25		
		4	38.75		24.7	24.8		
		5	38.75		24.7	24.8		
		6	38.75		24.7	24.8		
		7	38.75		24.7	24.8		
		8	38.75		24.7	24.8		
		9	38.75		24.7	24.8		
		9.5	38.75		24.7	24.8		

Table 19 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
15.04.98	1230	0	38.5		25	25.1	Winds N 6-7kn	YP & JD
		0.5	38.5		25	25.1	Strong current	
		1	38.5		25	25.1		
		2	38.9		24.5	24.6		
		3	39.05		24.5	24.6		
		4	39.1		24.4	24.5		
		5	39.2		24.4	24.5		
		6	39.2		24.4	24.5		
		7	39.3		24.4	24.5		
		8	39.35		24.4	24.5		
		9	39.35		24.4	24.5		
		10	39.35		24.4	24.5		
21.04.98	1300	0	39.75		23.9	24	Winds S SE 7kn	YP & IB
		0.5	39.75		23.9	24		
		1	39.75		23.9	24		
		2	39.75		23.9	24		
		3	39.75		23.7	23.8		
		4	39.75		23.7	23.8		
		5	39.75		23.6	23.7		
		6	39.85		23.5	23.6		
		7	39.9		23.5	23.6		
		8	40		23.4	23.5		
		9	40		23.3	23.4		
		9.5	40		23.3	23.4		
28.04.98	1315	0	39.55		23.8	23.9	Winds S 15kn	YP & IB
		0.5	39.55		23.8	23.9	Rough	
		1	39.55		23.8	23.9	Strong current	
		2	39.55		23.8	23.9		
		3	39.55		23.8	23.9		
		4	39.6		23.7	23.8		
		5	39.75		23.7	23.8		
		6	39.8		23.6	23.7		
		7	39.85		23.6	23.7		
		8	39.85		23.6	23.7		
		9	39.9		23.6	23.7		
		10	39.9		23.6	23.7		
		10.5	39.9		23.6	23.7		
5.05.98	1145	0	38.85		23.4	23.5	Winds S 8Kn	YP & IB
		0.5	38.85		23.4	23.5		
		1	38.85		23.4	23.5		
		2	38.85		23.4	23.5		
		3	38.85		23.4	23.5		
		4	38.85		23.4	23.5		
		5	38.85		23.4	23.5		
		6	40.35		23.4	23.5		
		7	40.7		23.4	23.5		
		8	40.8		23.4	23.5		
		9	40.8		23.4	23.5		
		9.5	40.8		23.4	23.5		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 20 Salinity and temperature data for PP40 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
07.03.98	1210	0	38.5		27.5	27.6		YP & KB
		0.5	38.5		27.2	27.3		
		1	38.6		26.7	26.8		
		2	38.7		26.5	26.6		
		3	38.9		26.5	26.6		
		4	39.6		26.7	26.8		
		5	39.9		26.7	26.8		
		6	40.1		27	27.1		
		7	40.3		27	27.1		
		8	40.85		27	27.1		
		9	40.85		26.8	26.9		
		10	40.85		26.8	26.9		
		11	40.85		26.8	26.9		
		12	40.85		26.8	26.9		
		13	40.85		26.8	26.9		
		14	40.85		26.8	26.9		
		14.5	40.85		26.8	26.9		
14.03.98	1045	0	39.6		25.7	25.8		YP & CS
		0.5	39.6		25.7	25.8		
		1	39.6		25.7	25.8		
		2	39.6		25.7	25.8		
		3	39.6		25.7	25.8		
		4	39.6		25.7	25.8		
		5	39.6		25.7	25.8		
		6	39.6		25.7	25.8		
		7	39.6		25.6	25.7		
		8	39.6		25.6	25.7		
		9	39.65		25.6	25.7		
		10	39.7		25.5	25.6		
		11	39.75		25.5	25.6		
		12	39.85		25.4	25.5		
		13	39.9		25.4	25.5		
		14	39.9		25.4	25.5		
		14.5	39.9		25.4	25.5		
16.03.98	1150	0	38.55		25.9	26	No wind, strong current	YP & BB
		0.5	38.55		25.7	25.8		
		1	38.6		25.7	25.8		
		2	38.75		25.4	25.5		
		3	39.4		25.6	25.7		
		4	39.45		25.9	26		
		5	39.55		25.9	26		
		6	40		25.9	26		
		7	40.05		25.9	26		
		8	40.05		25.9	26		
		9	40.05		25.9	26		
		10	40.05		25.9	26		
		11	40.05		25.9	26		
		12	40.05		25.9	26		
		13	40.05		25.9	26		
		14	40.05		25.9	26		
		14.5	40.05		25.9	26		
25.03.98	1255	0	38.75		25.9	26	Winds SE 1-2kn	YP & IB
		0.5	38.75		25.7	25.8		
		1	38.75		25.5	25.6		
		2	38.75		25.4	25.5		
		3	38.7		25.2	25.3		
		4	38.7		25.1	25.2		
		5	38.7		25	25.1		
		6	38.85		25	25.1		
		7	38.9		25	25.1		
		8	39		25	25.1		
		9	39.5		25	25.1		
		10	39.9		25.2	25.3		
		11	40.1		25.2	25.3		
		12	40.1		25.2	25.3		
		13	40.1		25.2	25.3		
		14	40.1		25.2	25.3		
		14.5	40.1		25.2	25.3		

Table 20 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
31.03.98	1210	0	37.3		25.9	26	Winds SE 2-3kn	YP & IB
		0.5	37.3		25.9	26	Strong current	
		1	37.4		25.4	25.5		
		2	37.5		25.2	25.3		
		3	38.6		25.4	25.5		
		4	40.1		25.7	25.8		
		5	40.4		25.7	25.8		
		6	40.5		25.7	25.8		
		7	40.5		25.7	25.8		
		8	40.5		25.6	25.7		
		9	40.5		25.6	25.7		
		10	40.5		25.6	25.7		
		11	40.6		25.6	25.7		
		12	40.8		25.6	25.7		
		13	40.8		25.6	25.7		
		14	40.8		25.6	25.7		
		15	40.8		25.6	25.7		
		15.5	40.8		25.6	25.7		
08.04.98	1205	0	38.65		25.1	25.2	Winds S 12kn	YP & IB
		0.5	38.65		25.1	25.2		
		1	38.65		25.1	25.2	Strong current	
		2	38.65		25.1	25.2		
		3	38.65		25.1	25.2		
		4	38.65		25.1	25.2		
		5	38.65		25.1	25.2		
		6	38.65		25.1	25.2		
		7	38.65		25.1	25.2		
		8	38.65		25.1	25.2		
		9	38.65		25.1	25.2		
		10	38.65		25.1	25.2		
		11	38.65		25.1	25.2		
		12	39.05		25.6	25.7		
		13	39.25		25.6	25.7		
		14	39.25		25.6	25.7		
		14.5	39.25		25.6	25.7		
15.04.98	1135	0	38.2		25	25.1	Winds NE 1-2kn	YP & JD
		0.5	38.2		24.5	24.6	Strong current	
		1	38.2		24.4	24.5	Sunny	
		2	38.35		24.4	24.5		
		3	38.5		24.4	24.5		
		4	38.5		24.4	24.5		
		5	38.5		24.4	24.5		
		6	39.1		24.4	24.5		
		7	39.3		24.4	24.5		
		8	39.85		24.6	24.7		
		9	39.9		24.6	24.7		
		10	39.9		24.6	24.7		
		11	39.9		24.6	24.7		
		12	39.95		24.6	24.7		
		13	39.95		24.6	24.7		
		14	39.95		24.6	24.7		
		15	39.95		24.6	24.7		
21.04.98	1230	0	39.9		24.1	24.2	Winds SE 7kn	YP & IB
		0.5	39.9		24.1	24.2	Rough	
		1	39.9		24.1	24.2		
		2	39.9		24.1	24.2		
		3	39.9		24.1	24.2		
		4	39.95		24.1	24.2		
		5	39.95		24.1	24.2		
		6	39.95		24.1	24.2		
		7	39.95		24.1	24.2		
		8	40		24.1	24.2		
		9	40		24.1	24.2		
		10	40		24.1	24.2		
		11	40		24.1	24.2		
		12	40		24.1	24.2		
		13	40		24.1	24.2		
		14	40		24.1	24.2		
		14.5	40		24.1	24.2		

Table20 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
5.05.98	1120	0	37.65		23.4	23.5	Winds S 8Kn	YP & IB
		0.5	37.65		23.4	23.5		
		1	37.65		23.4	23.5		
		2	37.65		23.4	23.5		
		3	37.7		23.4	23.5		
		4	38.45		23.6	23.7		
		5	39.05		23.6	23.7		
		6	37.7		23.6	23.7		
		7	40.4		23.4	23.5		
		8	40.85		23.4	23.5		
		9	41.15		23.3	23.4		
		10	41.3		23.2	23.3		
		11	41.35		23.2	23.3		
		12	41.5		23.2	23.3		
		13	41.5		23.2	23.3		
		14	41.5		23.2	23.3		
		14.5	41.5		23.2	23.3		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 21 Salinity and temperature data for PP50 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
07.03.98	1300	0	39.95		27.1	27.2		YP & KB
		0.5	39.95		27.1	27.2		
		1	39.95		27.1	27.2		
		2	40		26.8	26.9		
		3	40.25		26.8	26.9		
		4	40.25		26.8	26.9		
		5	40.25		26.8	26.9		
		6	40.4		26.8	26.9		
		7	40.4		26.8	26.9		
		8	40.4		26.8	26.9		
		9	40.4		26.8	26.9		
		10	40.65		26.8	26.9		
		11	40.7		26.8	26.9		
		12	40.7		26.8	26.9		
		13	40.7		26.8	26.9		
10.03.98	1045	0	39.05		26.9	27	Wind 15-20kn	YP & KB
		0.5	39.05		26.9	27	Secchi = 2.5m	
		1	39.05		26.9	27		
		2	39.05		26.9	27		
		3	39.05		26.9	27		
		4	39.05		26.9	27		
		5	39.05		26.9	27		
		6	39.05		26.9	27		
		7	40.15		27.1	27.2		
		8	40.85		27.1	27.2		
		9	40.85		27.1	27.2		
		10	40.85		27.1	27.2		
		11	40.85		27.1	27.2		
		12	40.85		27.1	27.2		
		13	40.85		27.1	27.2		
16.03.98	1325	0	38.9		26.4	26.5	No wind	YP & BB
		0.5	39		26.2	26.3		
		1	39.1		25.8	25.9		
		2	39.25		25.6	25.7		
		3	39.65		25.8	25.9		
		4	39.9		25.9	26		
		5	40.2		25.9	26		
		6	40.2		25.7	25.8		
		7	40.2		25.6	25.7		
		8	40.25		25.6	25.7		
		9	40.25		25.6	25.7		
		10	40.25		25.6	25.7		
		11	40.25		25.6	25.7		
		12	40.25		25.6	25.7		
		13	40.25		25.6	25.7		
		13.5	40.25		25.6	25.7		
25.03.98	1145	0	39.25		25.6	25.7	Winds SE 2kn	YP & IB
		0.5	39.25		25.6	25.7		
		1	39.25		25.4	25.5		
		2	39.25		25.2	25.3		
		3	39.25		25.1	25.2		
		4	39.25		25.1	25.2		
		5	39.25		25.1	25.2		
		6	39.25		25.1	25.2		
		7	39.45		25.1	25.2		
		8	39.85		25.2	25.3		
		9	40.15		25.2	25.3		
		10	40.25		25.2	25.3		
		11	40.3		25.2	25.3		
		12	40.4		25.1	25.2		
		13	40.5		25.1	25.2		
		13.5	40.5		25.1	25.2		

Table 21 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
31.03.98	1315	0	37.35		26.4	26.5	Calm, hot	YP & IB
		0.5	37.4		26.2	26.3	Instrument playing up	
		1	37.4		25.5	25.6		
		2	37.4		25.5	25.6		
		3	37.5		25.5	25.6		
		4	37.85		25.5	25.6		
		5	38.6		25.5	25.6		
		6	39.6		25.5	25.6		
		7	39.8		25.5	25.6		
		8	40		25.5	25.6		
		9	40.35		25.8	25.9		
		10	40.5		25.8	25.9		
		11	40.5		25.8	25.9		
		12	40.5		25.8	25.9		
		13	40.5		25.8	25.9		
		13.5	40.5		25.8	25.9		
08.04.98	1120	0	39		25.3	25.4	Winds S 12kn	YP & IB
		0.5	39		25.3	25.4	Strong current	
		1	39		25.3	25.4	Cloudy	
		2	39		25.3	25.4	**Equipment playing up**	
		3	39		25.3	25.4		
		4	39		25.3	25.4		
		5	39		25.3	25.4		
		6	39		25.3	25.4		
		7	39		25.3	25.4		
		8	39		25.3	25.4		
		9	39		25.3	25.4		
		10	39		25.4	25.5		
		11	39.65		25.5	25.6		
		12	40		26	26.1		
		13	40.1		26	26.1		
15.04.98	1100	0	39.4		24.7	24.8	Winds SE 1-2kn	YP & JD
		0.5	39.5		24.7	24.8	Sunny	
		1	39.5		24.7	24.8		
		2	39.5		24.5	24.6		
		3	39.5		24.5	24.6		
		4	39.5		24.4	24.5		
		5	39.5		24.4	24.5		
		6	39.5		24.4	24.5		
		7	39.5		24.4	24.5		
		8	39.5		24.4	24.5		
		9	40.05		24.4	24.5		
		10	40.05		24.4	24.5		
		11	40.05		24.4	24.5		
		12	40.1		24.4	24.5		
		13	40.1		24.4	24.5		
21.04.98	1150	0	40.1		24	24.1	Winds SE 7kn	YP & IB
		0.5	40.1		24	24.1	Rough	
		1	40.1		24	24.1		
		2	40.1		24	24.1		
		3	40.1		24	24.1		
		4	40.1		24	24.1		
		5	40.1		23.9	24		
		6	40.1		23.9	24		
		7	40.1		23.9	24		
		8	40.1		23.9	24		
		9	40.1		23.9	24		
		10	40.1		23.8	23.9		
		11	40.1		23.8	23.9		
		12	40.1		23.8	23.9		
		13	40.1		23.8	23.9		

Table 21 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
5.05.98	1040	0	38.45		23.4	23.5	Winds SE 8Kn	YP & IB
		0.5	38.45		23.4	23.5		
		1	38.45		23.4	23.5		
		2	38.45		23.4	23.5		
		3	38.45		23.4	23.5		
		4	38.6		23.4	23.5		
		5	38.9		23.4	23.5		
		6	39.2		23.5	23.6		
		7	40.8		23.4	23.5		
		8	40.95		23.3	23.4		
		9	41.15		23.3	23.4		
		10	41.4		23.3	23.4		
		11	41.4		23.3	23.4		
		12	41.5		23.3	23.4		
		13	41.5		23.3	23.4		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 22 Salinity and temperature data for PP60 from 5/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
05.03.98	1215	0	40.1		26.7	26.8	Calm	YP & KB
	1215	0.5	40.1		26.6	26.7		
	1215	1	40.1		26.5	26.6		
	1215	2	40.1		26.4	26.5		
	1215	3	40.2		26.1	26.2		
	1215	4	40.2		26.1	26.2		
	1215	5	40.3		26.1	26.2		
	1215	6	40.35		26.3	26.4		
	1215	7	40.5		26.3	26.4		
	1215	8	40.65		26.4	26.5		
	1215	9	40.75		26.4	26.5		
	1215	10	40.75		26.4	26.5		
	1215	11	40.75		26.4	26.5		
07.03.98	1040	0	39.6		27.1	27.3		YP & KB
	1040	0.5	39.6		27.1	27.3		
	1040	1	40		27	27.2		
	1040	2	40.35		27	27.2		
	1040	3	40.5		26.6	26.8		
	1040	4	40.5		26.6	26.8		
	1040	5	40.5		26.6	26.8		
	1040	6	40.6		26.6	26.8		
	1040	7	40.7		26.6	26.8		
	1040	8	40.75		26.6	26.8		
	1040	9	40.95		26.6	26.8		
	1040	10	40.95		26.6	26.8		
	1040	10.5	40.95		26.6	26.8		
09.03.98	1220	0	39.35		27.6	27.75		YP & KB
	1220	0.5	39.35		27.6	27.75		
	1220	1	39.35		27.5	27.65		
	1220	2	39.35		27.5	27.65		
	1220	3	39.45		27.2	27.35		
	1220	4	39.45		27.1	27.25		
	1220	5	39.5		27.1	27.25		
	1220	6	39.7		27.1	27.25		
	1220	7	40		27.1	27.25		
	1220	8	40.45		27.1	27.25		
	1220	9	40.6		27.1	27.25		
	1220	10	40.85		27.1	27.25		
	1220	11	40.85		27.1	27.25		
	1220	12	40.85		27.1	27.25		
10.03.98	1000	0	39.5		27	26.95	Wind picking up	YP & KB
		0.5	39.5		27	26.95	15-20kn	
		1	39.5		27	26.95	Secchi = 2m	
		2	39.5		27	26.95		
		3	39.5		27	26.95		
		4	39.6		27	26.95		
		5	39.7		27	26.95		
		6	39.85		27	26.95		
		7	40		27	26.95		
		8	40.95		27.4	27.35		
		9	40.95		27.4	27.35		
		10	40.95		27.4	27.35		
		11	41.15		27.4	27.35		
		12	41.15		27.4	27.35		
14.03.98	1000	0	40.8		25.9	26.05		YP & CS
		0.5	40.8		25.9	26.05		
		1	40.8		25.9	26.05		
		2	40.8		25.9	26.05		
		3	40.8		25.9	26.05		
		4	40.8		25.9	26.05		
		5	40.8		25.9	26.05		
		6	40.8		25.7	25.85		
		7	40.8		25.7	25.85		
		8	40.8		25.7	25.85		
		9	40.8		25.7	25.85		
		10	40.8		25.7	25.85		
		11	40.8		25.7	25.85		
		11.5	40.8		25.7	25.85		

Table 22 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
16.03.98	1100	0	40.4		26.1	26.15	Cloudy	YP & BB
		0.5	40.4		26.1	26.15		
		1	40.4		26	26.05		
		2	40.7		25.9	25.95		
		3	41		25.9	25.95		
		4	41.1		25.9	25.95		
		5	41.2		25.9	25.95		
		6	41.2		25.9	25.95		
		7	41.25		25.9	25.95		
		8	41.25		25.9	25.95		
		9	41.25		25.9	25.95		
		10	41.3		25.9	25.95		
		11	41.35		25.9	25.95		
		11.5	41.35		25.9	25.95		
25.03.98	1100	0	40.1		25.3	25.35	WindsE 2kn	YP & IB
		0.5	40.1		25.3	25.35		
		1	40.1		25.3	25.35		
		2	40.1		25.1	25.15		
		3	40.15		25.1	25.15		
		4	40.25		25.1	25.15		
		5	40.35		25.1	25.15		
		6	40.6		25.2	25.25		
		7	40.7		25.3	25.35		
		8	40.7		25.3	25.35		
		9	41.1		25.2	25.25		
		10	41.25		25	25.05		
		11	41.25		25	25.05		
		12	41.25		25	25.05		
31.03.98	1120	0	39.85		26.1	26.2	Winds E SE 1-2kn	YP & IB
		0.5	39.85		25.7	25.8	Strong current	
		1	39.9		25.6	25.7		
		2	39.95		25.5	25.6		
		3	40		25.5	25.6		
		4	40.2		25.5	25.6		
		5	40.2		25.5	25.6		
		6	40.3		25.7	25.8		
		7	40.5		25.7	25.8		
		8	40.6		25.7	25.8		
		9	40.65		25.7	25.8		
		10	40.65		25.7	25.8		
		11	40.7		25.7	25.8		
		12	40.7		25.7	25.8		
08.04.98	1035	0	39.45		25.1	25.1	Winds S 12kn	YP & IB
		0.5	39.45		25.1	25.1	Strong current	
		1	39.45		25.1	25.1	Cloudy	
		2	39.45		25.1	25.1		
		3	39.45		25.1	25.1		
		4	39.45		25.1	25.1		
		5	39.45		25.1	25.1		
		6	39.45		25.1	25.1		
		7	39.5		25.1	25.1		
		8	39.5		25.1	25.1		
		9	39.5		25.1	25.1		
		10	39.85		25.4	25.4		
		11	40.1		25.5	25.5		
		12	40.1		25.5	25.5		
15.04.98	1010	0	40.1		24.6	24.7	Winds SE 1-2kn	YP & JD
		0.5	40.1		24.6	24.7		
		1	40.1		24.5	24.6		
		2	40.1		24.4	24.5		
		3	40.1		24.3	24.4		
		4	40.1		24.3	24.4		
		5	40.1		24.3	24.4		
		6	40.7		24.3	24.4		
		7	40.8		24.3	24.4		
		8	40.8		24.3	24.4		
		9	40.8		24.3	24.4		
		10	40.8		24.3	24.4		
		11	40.8		24.3	24.4		
		12	40.8		24.3	24.4		

Table 22 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
21.4.98	1045	0	40.7		23.7	23.8	Winds SE 7kn	YP & IB
		0.5	40.7		23.7	23.8	Rough	
		1	40.7		23.7	23.8		
		2	40.7		23.7	23.8		
		3	40.7		23.7	23.8		
		4	40.7		23.7	23.8		
		5	40.7		23.7	23.8		
		6	40.7		23.7	23.8		
		7	40.7		23.7	23.8		
		8	40.7		23.7	23.8		
		9	40.75		23.7	23.8		
		10	40.8		23.7	23.8		
		11	41.1		23.7	23.8		
		11.5	41.2		23.7	23.8		
28.4.98	1115	0	41.05		23.6	23.6	Winds S 20kn	YP & IB
		0.5	41.05		23.6	23.6	Very rough	
		1	41.05		23.6	23.6	Strong current	
		2	41.05		23.6	23.6	**INSTRUMENT FAULTY**	
		3	41.05		23.6	23.6		
		4	41		23.6	23.6		
		5	41		23.6	23.6		
		6	41.05		23.6	23.6		
		7	41.05		23.6	23.6		
		8	41.05		23.6	23.6		
		9	41.05		23.6	23.6		
		10	41.05		23.6	23.6		
		11	41.05		23.6	23.6		
		12	41.05		23.6	23.6		
		12.5	41.05		23.6	23.6		
5.05.98	1010	0	39.15		23.6	23.65	Winds SE 5-8Kn	YP & IB
		0.5	39.15		23.6	23.65		
		1	39.15		23.6	23.65		
		2	39.15		23.6	23.65		
		3	39.15		23.6	23.65		
		4	39.3		23.6	23.65		
		5	39.5		23.6	23.65		
		6	39.75		23.7	23.75		
		7	40.8		23.5	23.55		
		8	41.1		23.5	23.55		
		9	41.6		23.5	23.55		
		10	41.7		23.5	23.55		
		11	41.85		23.5	23.55		
		12	42		23.5	23.55		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 23 Salinity and temperature data for PP70 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
07.03.98	1340	0	40.15		27.6	27.7	Very hot	YP & KB
		0.5	40.2		27.1	27.2		
		1	40.2		27.1	27.2		
		2	40.3		26.9	27		
		3	40.4		26.7	26.8		
		4	40.4		26.5	26.6		
		5	40.4		26.5	26.6		
		6	40.5		26.5	26.6		
		7	40.7		26.6	26.7		
		8	40.8		26.6	26.7		
		9	40.8		26.6	26.7		
		10	40.8		26.6	26.7		
10.03.98	1120	0	39.9		27	27.1	Secchi = 1.5m	YP & KB
		0.5	39.9		27	27.1		
		1	39.9		27	27.1		
		2	39.9		27	27.1		
		3	39.9		27	27.1		
		4	39.9		27	27.1		
		5	40		27	27.1		
		6	40.45		27	27.1		
		7	40.6		27	27.1		
		8	40.7		27.1	27.2		
		9	40.7		27.1	27.2		
		9.5	40.7		27.1	27.2		
16.03.98	1350	0	39.6		26.5	26.6	No wind, very cloudy	YP & BB
		0.5	39.6		26.4	26.5		
		1	39.65		26.1	26.2		
		2	40.15		25.9	26		
		3	40.35		25.6	25.7		
		4	40.4		25.6	25.7		
		5	40.4		25.6	25.7		
		6	40.4		25.6	25.7		
		7	40.45		25.6	25.7		
		8	40.45		25.6	25.7		
		9	40.45		25.6	25.7		
		10	40.45		25.6	25.7		
25.03.98	1540	0	39.5		27.6	27.7	No wind	YP & IB
		0.5	39.65		26.7	26.8	Very hot	
		1	39.65		26.5	26.6		
		2	39.7		25.3	25.4		
		3	39.7		25	25.1		
		4	39.8		25	25.1		
		5	39.8		25	25.1		
		6	40		25	25.1		
		7	40.1		25	25.1		
		8	40.35		25	25.1		
		9	40.6		25	25.1		
		9.5	40.6		25	25.1		
31.03.98	1400	0	37.9		26.4	26.5	Calm, hot	YP & IB
		0.5	37.9		26.4	26.5	Strong current, 2-3kn	
		1	37.95		25.6	25.7		
		2	38.1		25.6	25.7		
		3	38.95		25.6	25.7		
		4	39.9		25.6	25.7		
		5	40.1		25.8	25.9		
		6	40.1		25.8	25.9		
		7	40.25		25.8	25.9		
		8	40.3		25.8	25.9		
		9	40.3		25.8	25.9		
		10	40.3		25.8	25.9		
		10.5	40.3		25.8	25.9		
08.04.98	1410	0	39.2		25.1	25.2	Winds S Se 10kn	YP & IB
		0.5	39.2		25.1	25.2		
		1	39.2		25.1	25.2		
		2	39.2		25.2	25.3		
		3	39.2		25.2	25.3		
		4	39.2		25.2	25.3		
		5	39.2		25.2	25.3		
		6	39.2		25.1	25.2		
		7	39.2		24.9	25		
		8	39.85		25.2	25.3		
		9	40		25.4	25.5		
		9.5	40		25.4	25.5		

Table 23 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
15.04.98	1300	0	39.7		25	25.1	Winds N 8kn	YP & JD
		0.5	39.7		25	25.1	Strong current	
		1	39.7		25	25.1		
		2	39.75		24.5	24.6		
		3	39.85		24.4	24.5		
		4	39.9		24.4	24.5		
		5	40.1		24.4	24.5		
		6	40.1		24.4	24.5		
		7	40.25		24.4	24.5		
		8	40.3		24.4	24.5		
		9	40.35		24.4	24.5		
		10	40.35		24.4	24.5		
21.04.98	1445	0	40.2		24.3	24.4	Winds S 5kn	YP & IB
		0.5	40.2		24.3	24.4		
		1	40.2		24.3	24.4		
		2	40.2		24.3	24.4		
		3	40.2		24.2	24.3		
		4	40.2		24	24.1		
		5	40.2		24	24.1		
		6	40.2		23.9	24		
		7	40.2		23.9	24		
		8	40.2		23.7	23.8		
		9	40.25		23.7	23.8		
		9.5	40.25		23.7	23.8		
28.04.98	1205	0	40.55		23.7	23.8	Winds S 20kn	YP & IB
		0.5	40.6		23.7	23.8	Rough	
		1	40.6		23.7	23.8	Very strong current	
		2	40.6		23.7	23.8		
		3	40.6		23.7	23.8		
		4	40.6		23.7	23.8		
		5	40.6		23.7	23.8		
		6	40.6		23.7	23.8		
		7	40.6		23.7	23.8		
		8	40.6		23.7	23.8		
		9	40.6		23.7	23.8		
		10	40.6		23.7	23.8		
		11	40.6		23.7	23.8		
		11.5	40.6		23.7	23.8		
5.05.98	1305	0	39.05		23.7	23.8	Winds S 8Kn	YP & IB
		0.5	39.05		23.7	23.8		
		1	39.05		23.7	23.8		
		2	39.05		23.7	23.8		
		3	39.05		23.6	23.7		
		4	39.15		23.6	23.7		
		5	39.3		23.6	23.7		
		6	39.45		23.6	23.7		
		7	39.7		23.5	23.6		
		8	39.8		23.5	23.6		
		9	39.9		23.5	23.6		
		9.5	40.5		23.5	23.6		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 24 Salinity and temperature data for PP80 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
07.03.98	940	0	40.6		27	27.1	Wind picking up	YP & KB
		0.5	40.6		27	27.1		
		1	40.6		27	27.1		
		2	41		27	27.1		
		3	41		27	27.1		
		4	41.1		27	27.1		
		5	41.25		27	27.1		
		6	41.6		27	27.1		
		7	41.65		27	27.1		
		8	42.3		27	27.1		
		9	42.3		27	27.1		
10.03.98	915	0	41.5		27.5	27.6	Secchi = 2m	YP & KB
		0.5	41.5		27.5	27.6		
		1	41.5		27.5	27.6		
		2	41.5		27.5	27.6		
		3	41.55		27.5	27.6		
		4	41.75		27.5	27.6		
		5	42		27.5	27.6		
		6	42		27.5	27.6		
		7	42		27.5	27.6		
		8	42		27.5	27.6		
		9	42		27.5	27.6		
16.03.98	1020	0	41.75		25.6	25.7	Cloudy	YP & BB
		0.5	41.75		25.6	25.7		
		1	41.75		25.6	25.7		
		2	41.75		25.6	25.7		
		3	41.75		25.6	25.7		
		4	41.75		25.6	25.7		
		5	41.75		25.6	25.7		
		6	41.85		25.6	25.7		
		7	41.85		25.6	25.7		
		8	41.85		25.6	25.7		
		8.5	41.85		25.6	25.7		
25.03.98	955	0	41.55		25.1	25.2	Winds SE 4-5kn	YP & IB
		0.5	41.8		24.9	25		
		1	42.5		24.9	25		
		2	43		24.9	25	**SALINITY OFF SCALE**	
		3	43		24.7	24.8		
		4	43		24.6	24.7		
		5	43		24.6	24.7		
		6	43		24.6	24.7		
		7	43		24.6	24.7		
		8	43		24.6	24.7		
		9	43		24.6	24.7		
		9.5	43		24.6	24.7		
31.03.98	1040	0	43		26.1	26.2	**SALINITY OFF SCALE**	YP & IB
		0.5	43		26.1	26.2	Calm, hot, no clouds	
		1	43.1		26.1	26.2		
		2	43.1		26	26.1	***All values for salinity***	
		3	43.2		26	26.1	are approximates	
		4	43.2		26	26.1		
		5	43.2		26	26.1		
		6	43.2		26	26.1		
		7	43.3		26	26.1		
		8	43.3		26	26.1		
		8.5	43.3		26	26.1		
08.04.98	940	0	43		24.4	24.5	Winds S 12kn	YP & IB
		0.5	43		24.4	24.5	Strong current	
		1	43		24.4	24.5	Cloudy	
		2	43		24.5	24.6		
		3	43		24.5	24.6		
		4	43		24.5	24.6		
		5	43		24.5	24.6		
		6	43		24.5	24.6		
		7	43		24.5	24.6		
		8	43		24.5	24.6		
		8.5	43		24.5	24.6		

Table 24 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
15.04.98	930	0	42.2		24	24.1	Winds SE 4-5kn	YP & JD
		0.5	42.3		24	24.1	Sunny	
		1	42.5		24	24.1		
		2	43		24	24.1	**SALINITY OFF SCALE**	
		3	43		24	24.1		
		4	43.2		24	24.1		
		5	43.2		24	24.1		
		6	43.2		24	24.1		
		7	43.2		24	24.1		
		8	43.2		24	24.1		
		8.5	43.2		24	24.1		
21.04.98	950	0	43		23.1	23.2	Winds SE 7kn	YP & IB
		0.5	43		23.1	23.2	Rough	
		1	43		23.1	23.2		
		2	44		23.3	23.4	**SALINITY OFF SCALE**	
		3	44		23	23.1		
		4	44		23	23.1		
		5	44		23	23.1		
		6	44		23	23.1		
		7	44		23	23.1		
		8	44		23.3	23.4		
		8.5	44		23.4	23.5		
28.04.98	1020	0	44		23.2	23.3	Winds S 20kn	YP & IB
		0.5	44		23.2	23.3	Very rough	
		1	44		23.2	23.3	Strong current	
		2	44		23.2	23.3	**SALINITY OFF SCALE**	
		3	44		23.2	23.3		
		4	44		23.2	23.3		
		5	44		23.2	23.3		
		6	44		23.2	23.3		
		7	44		23.2	23.3		
		8	44		23.2	23.3		
		8.5	44		23.2	23.3		
5.05.98	935	0	41.5		23.2	23.3	Winds SE 5Kn	YP & IB
		0.5	41.5		23.2	23.3	Moderate current	
		1	41.5		23.2	23.3		
		2	42.2		23.2	23.3	**SALINITY OFF SCALE**	
		3	42.5		23.2	23.3		
		4	42.5		23.2	23.3		
		5	43		23.4	23.5		
		6	43		23.4	23.5		
		7	43		23.4	23.5		
		8	43		23.4	23.5		
		8.5	43		23.4	23.5		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 25 Salinity and temperature data for PP90 from 5/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (°C)	TEMPERATURE CALIBRATED (°C)	COMMENTS	RECORDER
05.03.98	1020	0	39.9		26.4	26.5		YP & KB
		0.5	39.9		26.4	26.5		
		1	39.9		26.4	26.5	Calibration information	
		2	40		26.1	26.2		
		3	40		26.3	26.4		
		4	40		26.3	26.4		
		5	40.3		26.4	26.5		
		6	40.5		26.4	26.5		
		7	40.5		26.4	26.5		
		8	40.5		26.4	26.5		
		9	40.5		26.4	26.5		
		10	40.5		26.4	26.5		
07.03.98	905	0	40.1		26.6	26.7	Very calm	YP & KB
		0.5	40.1		26.6	26.7		
		1	40.1		26.6	26.7		
		2	40.3		26.7	26.8	Calibration information	
		3	40.4		26.7	26.8		
		4	40.4		26.7	26.8		
		5	40.5		26.8	26.9		
		6	40.6		26.8	26.9		
		7	40.65		26.9	27		
		8	40.65		26.9	27		
		9	40.95		26.9	27		
		10	41.2		26.9	27		
		11	41.3		26.9	27		
09.03.98	1330	0	40.3		27.6	27.7	Wind picking up	YP & KB
		0.5	40.3		27.6	27.7		
		1	40.4		27.6	27.7		
		2	40.5		27.5	27.6	Calibration information	
		3	40.55		27.2	27.3		
		4	40.6		27.1	27.2		
		5	40.6		27.1	27.2		
		6	40.6		27.1	27.2		
		7	40.6		27.1	27.2		
		8	40.6		27.1	27.2		
		9	40.6		27.1	27.2		
		10	40.6		27.1	27.2		
		10.5	40.6		27.1	27.2		
10.03.98	850	0	40.95		27.1	27.2	Wind SW 8-10kn	YP & KB
		0.5	40.95		27.1	27.2	Cloudy 95%	
		1	40.95		27.1	27.2	Secchi = 1.5m	
		2	40.95		27.1	27.2		
		3	41		27.2	27.3		
		4	41		27.2	27.3	Calibration information	
		5	41.25		27.2	27.3		
		6	41.25		27.2	27.3		
		7	41.35		27.2	27.3		
		8	41.7		27.2	27.3		
		9	41.7		27.2	27.3		
		10	41.7		27.2	27.3		
13.03.98	820	0	42.7		24.4	24.5	Off scale	YP & KB
		0.5	42.7		24.4	24.5	Wind SE 20kn	
		1	42.7		24.4	24.5	Rough seas	
		2	42.7		24.4	24.5		
		3	42.7		24.4	24.5		
		4	42.7		24.4	24.5	Calibration information	
		5	42.7		24.4	24.5		
		6	42.7		24.4	24.5	***All values for salinity***	
		7	42.8		24.1	24.2	are approximates	
		8	42.8		24.1	24.2		
		9	42.8		24.1	24.2		
		9.5	42.9		24.1	24.2		
14.03.98	905	0	41.55		24.7	24.8		YP & CS
		0.5	41.55		24.7	24.8		
		1	41.55		24.7	24.8	Calibration information	
		2	41.75		24.5	24.6		
		3	41.9		24.5	24.6		
		4	41.9		24.4	24.5		
		5	41.9		24.4	24.5		
		6	42		24.4	24.5		
		7	42		24.3	24.4		
		8	42		24.3	24.4		
		9	42		24.3	24.4		
		10	42		24.3	24.4		

Table 25 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
16.03.98	940	0	41.35		25.5	25.6		YP & BB
		0.5	41.35		25.4	25.5		
		1	41.35		25.4	25.5	Calibration information	
		2	41.35		25.4	25.5		
		3	41.35		25.4	25.5		
		4	41.4		25.4	25.5		
		5	41.4		25.4	25.5		
		6	41.4		25.4	25.5		
		7	41.4		25.4	25.5		
		8	41.4		25.4	25.5		
		9	41.4		25.4	25.5		
		10	41.4		25.4	25.5		
25.03.98	915	0	41		24.7	24.8	Winds E 4-5kn	YP & IB
		0.5	41		24.7	24.8		
		1	41.1		24.7	24.8		
		2	41.5		24.7	24.8	Calibration information	
		3	41.6		24.7	24.8		
		4	42.1		24.6	24.7		
		5	42.4		24.6	24.7		
		6	42.6		24.6	24.7		
		7	43		24.6	24.7		
		8	43.5		24.7	24.8		
		9	43.6		24.7	24.8		
		10	43.7		24.7	24.8		
		10.5	43.8		24.7	24.8		
31.03.98	1000	0	42.5		25.7	25.8	Winds E NE 3-4kn	YP & IB
		0.5	42.5		25.7	25.8	Hot, no clouds	
		1	42.5		25.7	25.8		
		2	42.5		25.7	25.8		
		3	42.5		25.7	25.8		
		4	42.5		25.7	25.8		
		5	42.5		25.7	25.8		
		6	42.7		25.7	25.8		
		7	42.7		25.7	25.8		
		8	42.7		25.7	25.8		
		9	42.7		25.7	25.8		
		10	42.7		25.7	25.8		
		10.5	42.7		25.7	25.8		
08.04.98	900	0	40.85		24.3	24.4	Winds S 12kn	YP & IB
		0.5	40.85		24.3	24.4	Strong current	
		1	40.85		24.3	24.4	Cloudy	
		2	40.85		24.3	24.4		
		3	40.85		24.3	24.4	Calibration information	
		4	41.15		24.3	24.4		
		5	41.5		24.5	24.6		
		6	41.6		24.5	24.6		
		7	41.65		24.5	24.6		
		8	42.5		24.7	24.8	**SALINITY OFF SCALE**	
		9	42.7		24.7	24.8		
		10	43		24.5	24.6		
		10.5	43		24.5	24.6		
15.04.98	930	0	41.5		23.9	24	Winds SE 4-5kn	YP & JD
		0.5	41.5		23.9	24	Strong current	
		1	41.5		23.9	24	Sunny	
		2	41.6		23.9	24		
		3	41.9		23.9	24		
		4	42.1		23.9	24	**SALINITY OFF SCALE**	
		5	42.3		24	24.1		
		6	42.5		24	24.1	Calibration information	
		7	42.7		24	24.1		
		8	42.7		24	24.1		
		9	42.7		24	24.1		
		10	42.7		24	24.1		
		10.5	42.7		24	24.1		

Table 25 (continued)

DATE	TIME	DEPTH (m)	SALINITY (pss)	SALINITY CALIBRATED (pss)	TEMPERATURE (^{0}C)	TEMPERATURE CALIBRATED (^{0}C)	COMMENTS	RECORDER
21.04.98	910	0	41.6		23.2	23.3	Winds SE 7kn	YP & IB
		0.5	41.6		23.2	23.3	Rough	
		1	41.6		23.2	23.3		
		2	41.6		23.2	23.3		
		3	42.1		23.2	23.3	**SALINITY OFF SCALE**	
		4	43		23.4	23.5		
		5	43		23.4	23.5		
		6	43		23.4	23.5	Calibration information	
		7	43		23.4	23.5		
		8	43		23.4	23.5		
		9	43		23.4	23.5		
		10	43		23.4	23.5		
		10.5	43		23.4	23.5		
28.04.98	930	0	43		23.4	23.5	Winds S 20kn	YP & IB
		0.5	43		23.4	23.5	Very rough	
		1	43		23.4	23.5	Very strong current	
		2	43		23.4	23.5		
		3	43		23.4	23.5		
		4	43		23.4	23.5	**SALINITY OFF SCALE**	
		5	43.1		23.4	23.5		
		6	43.1		23.4	23.5	Calibration information	
		7	43.1		23.4	23.5		
		8	43.2		23.4	23.5		
		9	43.2		23.3	23.4		
		10	43.2		23.3	23.4		
		11	43.2		23.3	23.4		
		12	43.2		23.3	23.4		
		12.5	43.2		23.3	23.4		
5.0598	900	0	41.6		23.4	23.5	Winds SE 5Kn	YP & IB
		0.5	41.6		23.4	23.5	Moderate current	
		1	41.6		23.4	23.5		
		2	41.6		23.4	23.5		
		3	41.95		23.4	23.5		
		4	42.6		23.4	23.5	**SALINITY OFF SCALE**	
		5	42.8		23.4	23.5		
		6	43		23.4	23.5	Calibration information	
		7	43		23.4	23.5		
		8	43		23.4	23.5		
		9	43		23.4	23.5		
		10	43		23.4	23.5		
		10.5	43		23.4	23.5		

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

APPENDIX 3

Light Attenuation Data

Table 26 Light attenuation data for PP10 from 5/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
05.03.98	1445		#NUM!		3.5	10	Dead calm	YP & KB
07.03.98	1555	in air	3.15	1400	3	0		YP & KB
		0.1	3.08	1194				
		0.5	3.01	1032				
		1	2.94	877				
		2	2.80	627				
		3	2.66	461				
		4	2.52	332				
		5	2.40	251				
		6	2.25	177				
		7	2.09	124				
		8	1.96	92				
		in air	3.15	1400				
16.03.98	1500	0	3.22	1664	2.5	20	Winds NW 7-8kn	YP & BB
		0.1	3.21	1629				
		0.5	3.20	1567				
		1	2.96	916				
		2	2.75	565				
		3	2.71	511				
		4	2.58	382				
		5	2.45	285				
		6	2.32	207				
		7	2.19	154				
		8	2.06	116				
		0	3.22	1661				
25.03.98	1645	0	3.00	992	4	15	No wind	YP & IB
		0.1	2.87	739				
		0.5	2.73	534				
		1	2.65	449				
		2	2.45	285				
		3	2.29	196				
		4	2.15	140				
		5	1.99	97				
		6	1.85	70				
		7	1.68	48				
		7.2	1.61	41				
		0	2.79	611				
31.03.98	1530	0	3.13	1341	4	0	Winds SE 1-2kn, hot	YP & IB
		0.1	3.07	1177				
		0.5	3.02	1038				
		1	2.98	959				
		2	2.89	769				
		3	2.66	453				
		4	2.51	323				
		5	2.32	209				
		6	2.18	153				
		7	2.06	116				
		8	1.93	86				
		8.5	1.89	77				
		0	3.13	1352				
08.04.98	1505	in air	3.15	1413	2.5	50	Winds SE 5-7kn	YP & IB
		0.1	3.08	1204				
		0.5	3.07	1180				
		1	2.95	895				
		2	2.88	763				
		3	2.66	455				
		4	2.49	308				
		5	2.34	218				
		6	2.16	143				
		7	2.01	103				
		7.5	1.96	91				
		in air	3.15	1404				
15.04.98	1430	in air	3.17	1468	2	0	Winds SW 10kn	YP & JP
		0.1	3.15	1414				
		0.5	3.13	1345				
		1	3.05	1126				
		2	2.74	553				
		3	2.66	459				
		4	2.49	311				
		5	2.34	218				
		6	2.20	159				
		7	2.08	120				
		8	1.94	88				

Table 26 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($u Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
21.04.98	1540	in air	3.10	1273	3	0	Winds S 2kn	YP & IB
		0.1	3.08	1197				
		0.5	2.96	909				
		1	2.95	895				
		2	2.63	426				
		3	2.47	293				
		4	2.32	211				
		5	2.18	150				
		6	2.04	110				
		7	1.90	80				
		7.5	1.83	67				
28.04.98	1420	in air	3.17	1467		40	Winds S 15kn Moderate current	YP & IB
		0.1	3.10	1268				
		0.5	3.02	1046				
		1	2.95	898				
		2	2.65	447				
		3	2.54	345				
		4	2.39	243				
		5	2.28	190				
		6	2.15	141				
		7	1.97	94				
		8	1.80	63				
		in air	3.12	1319				
05.05.98	1355	in air	3.18	1504	2	40	Winds S 8Kn	YP & IB
		0.1	3.16	1430				
		0.5	3.11	1292				
		1	3.02	1045				
		2	2.83	680				
		3	2.64	440				
		4	2.55	358				
		5	2.33	213				
		6	2.24	174				
		7	2.15	141				
		7.5	2.05	111				
		in air	3.09	1236				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 27 Light attenuation data for PP20 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
07.03.98	1415	in air	3.23	1680	3	5	Seat temperature approx. 37°C, hot	YP & KB
		0.1	3.26	1811			First in air reading could be erroneous	
		0.5	3.20	1570				
		1	3.15	1403				
		2	3.03	1060				
		3	2.85	710				
		4	2.67	469				
		5	2.50	318				
		6	2.33	212				
		7	2.09	123				
		in air	3.30	2010				
09.03.98	1155	in air	3.29	1940		5		YP & KB
		0.1	3.24	1726				
		0.5	3.19	1557				
		1	3.11	1296				
		2	2.96	903				
		3	2.83	670				
		4	2.70	505				
		5	2.56	365				
		6	2.43	268				
		7	2.26	184				
		in air	3.29	1970				
13.03.98	1055	0	3.28	1897		0	Rough	YP & KB
		0.1	3.23	1702				
		0.5	3.03	1065				
		1	2.97	940				
		2	2.93	848				
		3	2.76	582				
		4	2.59	388				
		5	2.44	277				
		6	2.36	231				
		6.5	2.28	191				
14.03.98	1245	0	3.33	2132		5		YP & CS
		0.1	3.28	1904				
		0.5	3.09	1233				
		1	3.01	1032				
		2	2.99	975				
		3	2.91	814				
		4	2.83	679				
		5	2.67	469				
		6	2.58	379				
		7	2.45	285				
		0	3.31	2032				
16.03.98	1425	0	3.16	1455	4	70	Winds SW 7-8kn	YP & BB
		0.1	3.11	1292				
		0.5	3.08	1191				
		1	3.05	1121				
		2	2.87	735				
		3	2.81	644				
		4	2.65	451				
		5	2.45	283				
		6	2.34	220				
		7	2.22	165				
		0	3.10	1248				
25.03.98	1500	0	3.18	1524	5	5	No wind	YP & IB
		0.1	3.15	1416				
		0.5	3.11	1285				
		1	3.06	1152				
		2	2.94	869				
		3	2.82	659				
		4	2.65	442				
		5	2.53	341				
		6	2.39	244				
		6.5	2.30	200				
		0	3.22	1657				
31.03.98	1440	0	3.19	1556	6	0	Winds SE 5kn, hot	YP & IB
		0.1	3.15	1423				
		0.5	3.09	1238				
		1	3.01	1027				
		2	2.91	816				
		3	2.87	735				
		4	2.74	548				
		5	2.60	398				
		6	2.57	372				
		7	2.48	301				
		7.5	2.42	265				
		0	3.19	1565				

Table 27 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
08.04.98	1335	in air	3.16	1456	3	80	Winds S SE 12-14kn	YP & IB
		0.1	3.08	1196				
		0.5	2.92	826				
		1	2.87	748				
		2	2.84	690				
		3	2.72	520				
		4	2.66	460				
		5	2.54	343				
		6	2.43	268				
		6.5	2.40	251				
		in air	3.16	1442				
15.04.98	1345	in air	3.21	1639	2.5	0	Winds W 8kn	YP & JD
		0.1	3.18	1511				
		0.5	3.15	1413				
		1	3.13	1348				
		2	3.01	1026				
		3	2.68	481				
		4	2.51	320				
		5	2.36	228				
		6	2.17	149				
		7	2.00	100				
		in air	3.21	1620				
21.4.98	1400	in air	3.19	1560	3	0	Winds S 3-5kn	YP & IB
		0.1	3.16	1461				
		0.5	3.15	1416				
		1	3.03	1083				
		2	2.93	859				
		3	2.61	410				
		4	2.55	358				
		5	2.44	278				
		6	2.30	200				
		6.5	2.17	149				
		in air	3.18	1527				
28.04.98	1240	in air	3.22	1670	0.5	40	Winds S 20kn Rough Moderate current	YP & IB
		0.1	3.20	1591				
		0.5	3.19	1551				
		1	3.02	1036				
		2	2.88	756				
		3	2.61	409				
		4	2.45	281				
		5	2.37	235				
		6	2.09	123				
		7	1.96	92				
		7.5	1.86	72				
		in air	3.22	1652				
5.05.98	1230	in air	3.19	1553	1.5	30	Moderate current	YP & IB
		0.1	3.16	1450				
		0.5	3.08	1212				
		1	3.07	1171				
		2	2.95	896				
		3	2.88	763				
		4	2.63	431				
		5	2.58	382				
		6	2.51	320				
		7	2.40	254				
		in air	3.18	1521				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 28 Light attenuation data for PP30 from 13/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
13.03.98		0	3.22	1677	1.5		Rough	YP & KB
		0.1	3.15	1400				
		0.5	3.12	1327				
		1	2.98	953				
		2	2.92	838				
		3	2.72	525				
		4	2.62	414				
		5	2.48	300				
		6	2.29	197				
		7	2.16	145				
		8	2.02	104				
		0	1.95	90				
14.03.98	1030	0	3.27	1852	3.5	5		YP & CS
		0.1	3.25	1788				
		0.5	3.22	1663				
		1	3.19	1546				
		2	3.12	1322				
		3	2.87	747				
		4	2.77	585				
		5	2.65	442				
		6	2.55	357				
		7	2.46	290				
		8	2.33	214				
		9	2.25	176				
		9.5	2.12	131				
		0	3.27	1851				
16.03.98	1220	0	2.96	907	3.5	90	No wind less than 5kn	YP & BB
		0.1	2.87	740				
		0.5	2.85	709				
		1	2.64	439				
		2	2.58	384				
		3	2.47	293				
		4	2.39	245				
		5	2.34	218				
		6	2.29	197				
		7	2.15	142				
		8	1.98	95				
		9	1.88	76				
		9.5	1.72	52				
		0	2.93	848				
25.03.98	1355	0	3.30	1982	6	5	No wind	YP & IB
		0.1	3.21	1636				
		0.5	3.19	1540				
		1	3.15	1428				
		2	3.01	1025				
		3	2.95	901				
		4	2.87	742				
		5	2.68	478				
		6	2.60	394				
		7	2.50	317				
		8	2.40	254				
		9	2.26	180				
		9.5	2.18	150				
		0	3.28	1906				
31.03.98	1250	0	3.28	1892	5.5	0	Light breeze, hot Strong current, 1-2kn	YP & IB
		0.1	3.27	1842				
		0.5	3.21	1633				
		1	3.20	1587				
		2	3.02	1045				
		3	2.84	686				
		4	2.69	492				
		5	2.65	449				
		6	2.62	421				
		7	2.48	302				
		8	2.44	276				
		9	2.33	214				
		10	2.23	170				
		10.5	2.17	147				
		0	3.27	1862				

Table 28 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
08.04.98	1250	in air	3.29	1946	2	50	Winds S 12kn	YP & IB
		0.1	3.21	1604				
		0.5	3.16	1461				
		1	3.12	1307				
		2	3.10	1245				
		3	2.90	803				
		4	2.76	572				
		5	2.64	440				
		6	2.56	361				
		7	2.41	256				
		8	2.34	221				
		9	2.23	169				
		9.5	2.15	141				
		in air	3.27	1872				
15.04.98	1235	in air	3.23	1702	1.5	0	Winds N 6-7kn Very strong current	YP & JD
		0.1	3.21	1632				
		0.5	3.19	1533				
		1	2.96	916				
		2	2.79	620				
		3	2.78	605				
		4	2.47	295				
		5	2.41	260				
		6	2.35	223				
		7	2.24	174				
		8	2.15	141				
		9	2.05	111				
		10	1.90	79				
		in air	3.22	1645				
21.04.98	1310	in air	3.24	1726	3.5	0	Winds S SE 7kn Rough	YP & IB
		0.1	3.20	1575				
		0.5	3.14	1370				
		1	3.03	1080				
		2	2.93	854				
		3	2.74	552				
		4	2.65	445				
		5	2.51	325				
		6	2.42	264				
		7	2.26	184				
		8	2.15	140				
		9	1.98	95				
		9.5	1.92	83				
		in air	3.23	1714				
28.04.98	1320	in air	3.21	1637	1	40	Winds S 15kn Rough Strong current	YP & IB
		0.1	3.20	1574				
		0.5	3.16	1462				
		1	3.01	1020				
		2	2.98	963				
		3	2.71	514				
		4	2.65	450				
		5	2.55	356				
		6	2.33	214				
		7	2.23	170				
		8	2.11	129				
		9	1.89	77				
		10	1.85	70				
		10.5	1.81	64				
		in air	3.21	1610				
5.05.98	1155	in air	3.18	1500	1	40	Winds S 8Kn	YP & IB
		0.1	3.17	1482				
		0.5	3.16	1444				
		1	3.05	1127				
		2	3.01	1021				
		3	2.98	965				
		4	2.72	527				
		5	2.60	395				
		6	2.50	315				
		7	2.40	252				
		8	2.29	193				
		9	2.18	150				
		9.5	2.11	130				
		in air	3.18	1516				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 29 Light attenuation data for PP40 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
07.03.98	1205	in air	3.32	2110	6.5	0		YP & KB
		0.1	3.26	1830				
		0.5	3.21	1637				
		1	3.13	1362				
		2	3.11	1295				
		3	2.98	950				
		4	2.90	800				
		5	2.80	634				
		6	2.73	534				
		7	2.63	425				
		8	2.55	357				
		9	2.45	284				
		10	2.32	208				
		11	2.21	161				
		12	2.11	130				
		13	2.00	100				
		14	1.89	78.1				
		14.5	1.81	64.1				
		in air	3.31	2060				
14.03.98	1050	0	3.26	1815	3	0		YP & CS
		0.1	3.23	1681				
		0.5	3.19	1557				
		1	3.18	1525				
		2	2.99	972				
		3	2.91	807				
		4	2.73	531				
		5	2.56	366				
		6	2.49	307				
		7	2.35	226				
		8	2.27	185				
		9	2.20	160				
		10	2.13	135				
		11	2.05	113				
		12	1.96	91				
		13	1.89	78				
		14	1.76	57				
		14.5	1.60	40				
		0	3.26	1819				
16.03.98	1155	0	2.98	964	4.5	75	No wind, strong current	YP & BB
		0.1	2.94	875				
		0.5	2.87	742				
		1	2.83	680				
		2	2.74	548				
		3	2.66	459				
		4	2.58	380				
		5	2.47	292				
		6	2.40	251				
		7	2.30	201				
		8	2.20	159				
		9	2.12	133				
		10	2.02	105				
		11	1.91	81				
		12	1.81	65				
		13	1.68	48				
		14	1.56	36				
		14.5	1.45	28				
25.03.98	1300	0	3.32	2092	6	5	Winds SE 1-2kn	YP & IB
		0.1	3.25	1798				
		0.5	3.22	1678				
		1	3.18	1518				
		2	3.09	1230				
		3	3.01	1014				
		4	2.90	787				
		5	2.73	535				
		6	2.62	414				
		7	2.55	352				
		8	2.45	279				
		9	2.37	237				
		10	2.31	202				
		11	2.19	156				
		12	2.07	117				
		13	1.92	84				
		14	1.79	61				
		15	1.66	46				
		0	3.30	2003				

Table 29 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
31.03.98	1215	0	3.28	1893	4.5	0	Winds SE 2-3kn, hot Strong current 3-4kn	YP & IB
		0.1	3.26	1831				
		0.5	3.24	1736				
		1	3.09	1240				
		2	3.00	994				
		3	2.90	787				
		4	2.86	726				
		5	2.81	642				
		6	2.69	489				
		7	2.54	349				
		8	2.45	281				
		9	2.37	235				
		10	2.28	189				
		11	2.18	152				
		12	2.08	119				
		13	1.95	89				
		14	1.83	67				
		15	1.70	50				
		15.5	1.61	41				
		0	3.27	1879				
08.04.98	1215	in air	3.30	1985	1.5	50	Winds S 12kn Strong current Cloudy	YP & IB
		0.1	3.27	1855				
		0.5	3.24	1752				
		1	3.05	1129				
		2	2.92	841				
		3	2.84	695				
		4	2.74	545				
		5	2.70	504				
		6	2.60	400				
		7	2.46	287				
		8	2.40	249				
		9	2.35	222				
		10	2.27	188				
		11	2.21	162				
		12	2.10	125				
		13	1.95	90				
		14	1.86	72				
		15	1.75	56				
		in air	3.26	1801				
15.04.98	1140	in air	3.22	1641	2.5	0	Winds NE 1-2kn	YP & JD
		0.1	3.18	1519				
		0.5	3.07	1164				
		1	3.03	1066				
		2	2.97	928				
		3	2.87	735				
		4	2.70	497				
		5	2.61	408				
		6	2.56	363				
		7	2.40	254				
		8	2.28	191				
		9	2.18	153				
		10	2.06	114				
		11	1.92	84				
		12	1.81	64				
		13	1.67	47				
		14	1.53	34				
		15	1.34	22				
		in air	3.23	1682				
21.04.98	1235	in air	3.23	1695	1.5	0	Winds SE 7kn Rough	YP & IB
		0.1	3.16	1458				
		0.5	3.12	1325				
		1	2.97	924				
		2	2.87	734				
		3	2.76	570				
		4	2.67	468				
		5	2.55	355				
		6	2.40	253				
		7	2.34	221				
		8	2.24	173				
		9	2.14	138				
		10	2.00	100				
		11	1.92	84				
		12	1.81	65				
		13	1.72	52				
		14	1.64	44				
		14.5	1.53	34				
		in air	3.22	1651				

Table 29 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
05.05.98	1125	in air	3.20	1587	1.5	20	Winds S 8kn Rough	YP & IB
		0.1	3.16	1455				
		0.5	3.08	1200				
		1	3.01	1018				
		2	2.96	918				
		3	2.85	705				
		4	2.79	619				
		5	2.66	458				
		6	2.53	342				
		7	2.41	256				
		8	2.27	187				
		9	2.18	150				
		10	2.09	123				
		11	1.96	91				
		12	1.83	67				
		13	1.70	50				
		14	1.56	36				
		14.5	1.45	28				
		in air	3.18	1513				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 30 Light attenuation data for PP50 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
07.03.98	1245	0	3.33	2130	4	0		YP & KB
		0.1	3.27	1850				
		0.5	3.24	1730				
		1	3.20	1600				
		2	3.02	1058				
		3	2.93	848				
		4	2.80	628				
		5	2.66	454				
		6	2.55	353				
		7	2.44	275				
		8	2.32	210				
		9	2.22	165				
		10	2.10	127				
		11	2.00	100				
		12	1.84	69.7				
		13	1.71	51.5				
		0	3.34	2170				
16.03.98	1330	0	2.81	640	2.5	95	No wind	YP & BB
		0.1	2.67	465				
		0.5	2.65	444				
		1	2.57	369				
		2	2.44	275				
		3	2.35	224				
		4	2.29	194				
		5	2.18	151				
		6	2.17	147				
		7	2.07	117				
		8	1.95	90				
		9	1.76	57				
		10	1.61	41				
		11	1.48	30				
		12	1.41	26				
		13	1.20	16				
		13.5	1.15	14				
		0	2.81	648				
25.03.98	1055	0	3.30	1973	5.5	5	Winds SE 2kn	YP & IB
		0.1	3.25	1782				
		0.5	3.22	1656				
		1	3.02	1045				
		2	2.97	933				
		3	2.89	783				
		4	2.79	614				
		5	2.74	546				
		6	2.64	432				
		7	2.54	343				
		8	2.45	282				
		9	2.36	230				
		10	2.25	178				
		11	2.13	134				
		12	2.02	104				
		13	1.85	71				
		13.2	1.80	63				
		0	3.29	1947				
31.03.98	1330	0	3.26	1832	6.5	0	Calm, hot	YP & IB
		0.1	3.24	1744				
		0.5	3.20	1591				
		1	3.10	1247				
		2	3.04	1097				
		3	2.98	957				
		4	2.73	537				
		5	2.71	517				
		6	2.65	451				
		7	2.55	355				
		8	2.45	283				
		9	2.34	220				
		10	2.26	180				
		11	2.15	142				
		12	2.03	107				
		13	1.91	82				
		13.5	1.80	63				
		0	3.26	1807				

Table 30 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
08.04.98	1130	in air	3.26	1803	4	70	Winds S 12kn	YP & IB
		0.1	3.25	1779			Strong current	
		0.5	3.22	1678			Cloudy	
		1	3.20	1576				
		2	3.05	1116				
		3	2.91	804				
		4	2.79	616				
		5	2.63	422				
		6	2.53	339				
		7	2.43	271				
		8	2.31	203				
		9	2.20	160				
		10	2.08	119				
		11	1.97	94				
		12	1.87	74				
		13	1.66	46				
		in air	3.22	1668				
15.04.98	1100	in air	3.20	1595	2.5	0	Winds SE 1-2kn	YP & JD
		0.1	3.16	1452			Sunny	
		0.5	3.03	1063				
		1	2.96	920				
		2	2.91	810				
		3	2.68	476				
		4	2.59	386				
		5	2.43	270				
		6	2.32	208				
		7	2.22	165				
		8	2.10	126				
		9	2.02	105				
		10	1.86	72				
		11	1.72	53				
		12	1.57	37				
		13	1.43	27				
		in air	3.19	1565				
21.04.98	1200	in air	3.27	1855	3.5	0	Winds SE 7kn	YP & IB
		0.1	3.24	1722			Rough	
		0.5	3.20	1574				
		1	3.12	1321				
		2	3.01	1014				
		3	2.87	738				
		4	2.60	400				
		5	2.51	320				
		6	2.43	270				
		7	2.29	195				
		8	2.21	164				
		9	2.09	122				
		10	1.98	96				
		11	1.88	75				
		12	1.75	56				
		13	1.61	41				
		in air	3.27	1845				
5.05.98	1050	in air	3.19	1553	1.5	40	Winds SE 8Kn	YP & IB
		0.1	3.12	1329				
		0.5	3.08	1215				
		1	3.05	1130				
		2	2.98	955				
		3	2.78	596				
		4	2.65	445				
		5	2.55	358				
		6	2.48	305				
		7	2.39	247				
		8	2.29	193				
		9	2.19	155				
		10	2.09	123				
		11	1.95	89				
		12	1.80	63				
		13	1.66	46				
		in air	3.22	1668				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 31 Light attenuation data for PP60 from 5/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\upsilon Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
05.03.98	1220		#NUM!		4	50	Calm	YP & KB
07.03.98	1030	in air	3.28	1925	4.5	0		YP & KB
		0.1	3.22	1650				
		0.5	3.19	1545				
		1	3.16	1450				
		2	2.97	930				
		3	2.90	790				
		4	2.80	632				
		5	2.69	495				
		6	2.57	375				
		7	2.48	300				
		8	2.35	224				
		9	2.26	180				
		10	2.15	140				
		11	2.04	110				
		12	1.94	87				
		in air	3.28	1920				
09.03.98	1230	in air	3.29	1950	4	5	Something is wrong with the equipmen	YP & KB
		0.1	3.26	1812			EQUIPMENT FAILURE	
		0.5	3.25	1776			EQUIPMENT FAILURE	
		1	3.28	1906			EQUIPMENT FAILURE	
		2	3.08	1211			EQUIPMENT FAILURE	
		3	2.99	980			EQUIPMENT FAILURE	
		4	2.92	828			EQUIPMENT FAILURE	
		5	2.91	815			EQUIPMENT FAILURE	
		6	2.97	928			EQUIPMENT FAILURE	
		7	2.96	908			EQUIPMENT FAILURE	
		8	2.98	948			EQUIPMENT FAILURE	
		9	2.46	289			EQUIPMENT FAILURE	
		10	2.47	298			EQUIPMENT FAILURE	
		11	2.28	189			EQUIPMENT FAILURE	
		12	2.11	128			EQUIPMENT FAILURE	
		in air	3.29	1950			EQUIPMENT FAILURE	
14.03.98	1005	0	3.21	1638	1.75	0		YP & CS
		0.1	3.18	1507				
		0.5	3.08	1211				
		1	3.04	1087				
		2	2.97	937				
		3	2.81	642				
		4	2.64	436				
		5	2.52	333				
		6	2.40	250				
		7	2.24	172				
		8	2.12	132				
		9	2.02	105				
		10	1.91	82				
		11	1.81	65				
		11.5	1.72	52				
		0	3.23	1690				
16.03.98	1105	0	3.09	1224	2.5	90	Very cloudy	YP & BB
		0.1	3.04	1084				
		0.5	2.95	884				
		1	2.84	689				
		2	2.69	489				
		3	2.54	346				
		4	2.46	288				
		5	2.35	223				
		6	2.25	179				
		7	2.14	139				
		8	2.03	108				
		9	1.92	84				
		10	1.81	65				
		11	1.67	47				
		11.5	1.60	40				
		0	3.13	1334				

Table 31 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
25.03.98	1110	0	3.27	1875	4.5	5	Winds E 2kn	YP & IB
		0.1	3.22	1673				
		0.5	3.18	1501				
		1	3.08	1193				
		2	3.00	992				
		3	2.87	737				
		4	2.79	610				
		5	2.64	432				
		6	2.51	325				
		7	2.42	265				
		8	2.32	207				
		9	2.21	163				
		10	2.11	130				
		11	2.02	104				
		12	1.86	73				
		0	3.24	1750				
31.03.98	1125	0	3.26	1813	6	0	Winds E SE 1-2kn Strong current	YP & IB
		0.1	3.23	1711				
		0.5	3.22	1655				
		1	3.21	1632				
		2	3.11	1299				
		3	2.91	820				
		4	2.80	632				
		5	2.66	457				
		6	2.57	374				
		7	2.46	289				
		8	2.38	240				
		9	2.29	194				
		10	2.21	162				
		11	2.08	121				
		12	1.97	94				
		0	3.25	1798				
08.04.98	1045	in air	3.25	1781	1.5	80	Winds S 12kn Strong current C loudy	YP & IB
		0.1	3.19	1533				
		0.5	3.13	1346				
		1	3.00	1006				
		2	2.94	876				
		3	2.78	596				
		4	2.67	471				
		5	2.62	419				
		6	2.44	274				
		7	2.33	213				
		8	2.29	197				
		9	2.21	164				
		10	2.10	125				
		11	1.97	94				
		12	1.83	67				
		in air	3.24	1752				
4.98	1025	in air	3.18	1515	4	0	Winds SE 1-2kn	YP & JD
		0.1	3.13	1348				
		0.5	3.00	990				
		1	2.98	952				
		2	2.87	748				
		3	2.72	521				
		4	2.59	389				
		5	2.41	260				
		6	2.30	199				
		7	2.17	149				
		8	2.07	118				
		9	1.95	90				
		10	1.86	72				
		11	1.71	51				
		12	1.58	38				
		in air	3.19	1548				

Table 31 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
21.04.98	1050	in air	3.20	1582	2	0	Winds SE 7kn Rough	YP & IB
		0.1	3.17	1490				
		0.5	3.15	1427				
		1	3.11	1292				
		2	2.95	897				
		3	2.74	555				
		4	2.60	400				
		5	2.54	349				
		6	2.33	214				
		7	2.24	175				
		8	2.11	129				
		9	1.97	94				
		10	1.87	74				
		11	1.79	62				
		11.5	1.68	48				
		in air	3.19	1548				
28.04.98	1125	in air	3.19	1547	<1	30	Winds S 20kn Very rough Strong current	YP & IB
		0.1	3.12	1307				
		0.5	3.10	1256				
		1	2.99	972				
		2	2.81	647				
		3	2.64	437				
		4	2.54	346				
		5	2.39	246				
		6	2.24	174				
		7	2.12	131				
		8	1.99	97				
		9	1.88	76				
		10	1.73	54				
		11	1.61	41				
		12	1.51	32				
		12.5	1.40	25				
		in air	3.20	1583				
5.05.98	1020	in air	3.16	1447	3.5	40	Winds SE 5-8Kn	YP & IB
		0.1	3.14	1385				
		0.5	3.05	1127				
		1	2.98	947				
		2	2.69	491				
		3	2.59	386				
		4	2.54	344				
		5	2.44	277				
		6	2.35	223				
		7	2.28	192				
		8	2.18	151				
		9	2.02	104				
		10	1.96	91				
		11	1.82	66				
		12	1.68	48				
		in air	3.17	1465				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 32 Light attenuation data for PP70 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
07.03.98	1335	in air	3.32	2100	3.5	5	Very hot	YP & KB
		0.1	3.27	1857				
		0.5	3.18	1530				
		1	3.16	1448				
		2	3.01	1020				
		3	2.88	760				
		4	2.74	555				
		5	2.58	384				
		6	2.45	285				
		7	2.30	200				
		8	2.18	153				
		9	2.03	106				
		10	1.92	83.2				
		in air	3.34	2170				
16.03.98	1355	0	2.81	639	2.5	95	Cloudy, no wind	YP & BB
		0.1	2.70	500				
		0.5	2.63	425				
		1	2.52	334				
		2	2.46	286				
		3	2.40	251				
		4	2.25	178				
		5	2.16	146				
		6	2.05	111				
		7	1.93	85				
		8	1.83	68				
		9	1.70	50				
		10	1.59	39				
		0	2.84	686				
25.03.98	1545	0	3.14	1366	5.5	5	No wind, very hot	YP & IB
		0.1	3.03	1081				
		0.5	2.97	924				
		1	2.92	823				
		2	2.84	691				
		3	2.66	458				
		4	2.56	360				
		5	2.43	270				
		6	2.32	210				
		7	2.22	166				
		8	2.12	132				
		9	1.99	97				
		9.5	1.90	80				
		0	3.14	1372				
31.03.98	1405	0	3.25	1766	6	0	No wind, very hot	YP & IB
		0.1	3.22	1644				
		0.5	3.19	1565				
		1	3.03	1062				
		2	3.01	1016				
		3	2.97	924				
		4	2.78	603				
		5	2.64	433				
		6	2.54	347				
		7	2.45	282				
		8	2.37	232				
		9	2.20	159				
		10	2.09	124				
		10.5	2.05	111				
		0	3.23	1717				
08.04.98		in air	3.26	1828	4	80	Winds S SE 10kn	YP & IB
		0.1	3.19	1561				
		0.5	3.12	1331				
		1	3.08	1201				
		2	2.90	788				
		3	2.82	656				
		4	2.68	478				
		5	2.60	396				
		6	2.48	299				
		7	2.41	257				
		8	2.32	209				
		9	2.11	128				
		9.5	1.91	81				
		in air	3.25	1794				

Table 32 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
15.04.98	1310	in air	3.24	1748	1.5	0	Winds N 8kn	YP & JD
		0.1	3.18	1519				
		0.5	3.08	1206				
		1	3.03	1063				
		2	2.90	799				
		3	2.73	538				
		4	2.55	356				
		5	2.41	256				
		6	2.29	194				
		7	2.18	153				
		8	2.01	102				
		9	1.91	81				
		10	1.79	61				
		in air	3.26	1802				
21.04.98	1450	in air	3.18	1502	2.5	0	Winds S 3-5kn	YP & IB
		0.1	3.12	1305				
		0.5	3.10	1258				
		1	2.88	767				
		2	2.76	571				
		3	2.54	349				
		4	2.41	257				
		5	2.25	179				
		6	2.10	127				
		7	1.96	92				
		8	1.81	64				
		9	1.65	45				
		9.5	1.51	32				
		in air	3.19	1533				
28.04.98	1210	in air	3.22	1647	1	40	Winds S 20kn Very rough Very strong current	YP & IB
		0.1	3.08	1214				
		0.5	3.04	1088				
		1	2.99	984				
		2	2.80	634				
		3	2.61	403				
		4	2.56	360				
		5	2.41	258				
		6	2.26	182				
		7	2.14	137				
		8	1.99	97				
		9	1.85	71				
		10	1.74	55				
		11	1.60	40				
		in air	3.21	1635				
5.05.98	1310	in air	3.14	1370	1	40	Winds S 8Kn Rough	YP & IB
		0.1	3.07	1175				
		0.5	3.00	1007				
		1	2.97	935				
		2	2.89	777				
		3	2.74	544				
		4	2.58	380				
		5	2.37	233				
		6	2.32	209				
		7	2.22	166				
		8	2.15	140				
		9	2.08	120				
		10	2.05	113				
		in air	3.07	1174				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 33 Light attenuation data for PP80 from 7/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
07.03.98	945	in air	3.27	1860	5.5	0	Wind picking up	YP & KB
		0.1	3.16	1460				
		0.5	3.05	1118				
		1	2.98	958				
		2	2.86	720				
		3	2.79	610				
		4	2.62	420				
		5	2.54	350				
		6	2.45	285				
		7	2.34	220				
		8	2.21	162				
		8.5	2.16	146				
		in air	3.23	1680				
16.03.98	1020	0	2.98	951	3.5	70	Cloudy	YP & BB
		0.1	2.90	793				
		0.5	2.84	694				
		1	2.78	598				
		2	2.66	453				
		3	2.48	301				
		4	2.33	215				
		5	2.21	161				
		6	2.11	128				
		7	1.96	92				
		8	1.84	69				
		8.5	1.78	60				
		0	2.91	807				
25.03.98	1005	0	3.16	1455	3.5	5	Winds 4-5kn	YP & IB
		0.1	3.15	1416				
		0.5	3.09	1236				
		1	3.08	1202				
		2	3.02	1049				
		3	2.83	680				
		4	2.61	412				
		5	2.52	328				
		6	2.42	264				
		7	2.31	205				
		8	2.15	142				
		9	2.07	118				
		9.2	1.98	96				
		0	3.15	1421				
31.03.98	1045	0	3.22	1670	6.5	0	Still, hot, no cloud	YP & IB
		0.1	3.18	1508				
		0.5	3.12	1320				
		1	3.09	1237				
		2	2.97	931				
		3	2.89	782				
		4	2.60	401				
		5	2.54	345				
		6	2.40	251				
		7	2.28	191				
		8	2.18	152				
		8.5	2.13	136				
		0	3.22	1662				
08.04.98	945	in air	3.12	1305	1	95	Winds S 12kn Strong Current Cloudy	YP & IB
		0.1	3.07	1172				
		0.5	2.92	832				
		1	2.84	688				
		2	2.63	426				
		3	2.49	312				
		4	2.37	235				
		5	2.25	179				
		6	2.17	149				
		7	2.11	130				
		8	2.01	103				
		8.5	1.93	85				
		in air	3.12	1327				

Table 33 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
15.04.98	935	in air	3.18	1528	1.5	0	Winds SE 4-5kn Sunny	YP & JD
		0.1	3.16	1450				
		0.5	3.00	1004				
		1	2.97	925				
		2	2.87	736				
		3	2.61	408				
		4	2.49	306				
		5	2.36	231				
		6	2.20	157				
		7	2.07	118				
		8	1.97	94				
		8.5	1.92	84				
		in air	3.20	1580				
21.04.98	1000	in air	3.13	1359	2	0	Winds SE 7kn Rough	YP & IB
		0.1	3.06	1156				
		0.5	3.03	1061				
		1	2.92	828				
		2	2.86	729				
		3	2.61	405				
		4	2.45	280				
		5	2.35	226				
		6	2.15	141				
		7	2.10	126				
		8	1.95	90				
		8.5	1.88	76				
		in air	3.12	1311				
28.04.98	1025	in air	3.14	1385	<1	40	Winds S 20kn Very rough Strong Current	YP & IB
		0.1	3.11	1300				
		0.5	3.05	1111				
		1	3.04	1090				
		2	2.70	500				
		3	2.58	380				
		4	2.44	274				
		5	2.31	202				
		6	2.20	160				
		7	2.09	124				
		8	2.00	100				
		8.5	1.88	75				
		in air	3.14	1394				
5.05.98	940	in air	3.06	1152	2	40	Winds SE 5Kn Moderate Current	YP & IB
		0.1	3.06	1136				
		0.5	3.00	992				
		1	2.94	873				
		2	2.74	547				
		3	2.58	384				
		4	2.49	308				
		5	2.28	191				
		6	2.18	153				
		7	2.07	117				
		8	1.99	97				
		8.5	1.86	72				
		in air	3.01	1033				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

Table 34 Light attenuation data for PP90 from 5/3/98 to 5/5/98

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
05.03.98	1030				4.5	40		YP & KB
07.03.98	830	in air	3.04	1090	5	0	Very calm	YP & KB
		0.1	2.94	863				
		0.5	2.87	740				
		1	2.81	642				
		2	2.64	434				
		3	2.49	306				
		4	2.35	223				
		5	2.22	166				
		6	2.08	119				
		7	1.93	85				
		8	1.84	68.8				
		9	1.72	52.8				
		10	1.61	41.1				
		11	1.48	30.1				
		in air	3.05	1120				
09.03.98			#NUM!		4		EQUIPMENT FAILURE	YP & KB
13.03.98	830	0	2.99	968	1	0	Winds SE 20kn	YP & KB
		0	2.98	960			Rough seas	
		0.5	2.82	668				
		1	2.78	605				
		2	2.52	332				
		3	2.34	217				
		4	2.19	154				
		5	1.97	93				
		6	1.91	81				
		7	1.75	56				
		8	1.43	27				
		9	1.28	19				
		9.5	1.08	12				
14.03.98	915	0	3.13	1364	2.5	0		YP & CS
		0.1	3.13	1336				
		0.5	3.03	1076				
		1	2.98	955				
		2	2.90	799				
		3	2.63	424				
		4	2.45	281				
		5	2.31	203				
		6	2.19	156				
		7	2.07	118				
		8	1.93	86				
		9	1.78	60				
		10	1.65	45				
		0	3.12	1305				
16.03.98	945	0	3.17	1476	3.5	50		YP & BB
		0	3.15	1418				
		0.5	3.14	1372				
		1	2.99	988				
		2	2.76	576				
		3	2.04	110				
		4	2.00	99				
		5	1.97	93				
		6	1.92	84				
		7	1.87	74				
		8	1.81	65				
		9	1.76	58				
		10	1.72	52				
		0	3.17	1495				
25.03.98	920	0	3.14	1366	2.5	5	Winds E 4-5kn	YP & IB
		0	3.11	1296				
		0.5	3.04	1089				
		1	2.94	870				
		2	2.88	757				
		3	2.65	449				
		4	2.51	327				
		5	2.36	230				
		6	2.23	170				
		7	2.08	119				
		8	1.98	96				
		9	1.86	72				
		10	1.75	56				
		10.5	1.66	46				
		0	3.13	1336				

Table 34 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
31.03.98	1010	0	3.18	1523	5	0	Winds E NE 3-4kn	YP & IB
		0	3.13	1344			Hot, no cloud	
		0.5	3.08	1207				
		1	2.98	955				
		2	2.88	761				
		3	2.71	510				
		4	2.63	425				
		5	2.36	228				
		6	2.28	192				
		7	2.17	148				
		8	2.05	112				
		9	1.94	87				
		10	1.82	66				
		10.5	1.78	60				
		0	3.18	1509				
08.04.98	910	in air	2.92	830	1	95	Winds S 12kn	YP & IB
		0.1	2.85	716			Strong current	
		0.5	2.82	663			Cloudy	
		1	2.61	412			Wind effecting readings	
		2	2.50	313				
		3	2.34	219				
		4	2.21	161				
		5	2.04	110				
		6	1.94	87				
		7	1.85	70				
		8	1.72	52				
		9	1.64	44				
		10	1.57	37				
		10.5	1.48	30				
		in air	3.01	1014				
15.04.98	900	in air	3.08	1200		0	Winds SE 4-5kn	YP & JD
		0.1	3.05	1120			Strong current	
		0.5	2.92	838			Sunny	
		1	2.82	658				
		2	2.65	450				
		3	2.48	299				
		4	2.33	212				
		5	2.20	159				
		6	2.06	116				
		7	1.92	83				
		8	1.80	63				
		9	1.68	48				
		10	1.57	37				
		10.5	1.48	30				
		in air	3.09	1217				
21.04.98	915	in air	2.99	978	1.5	0	Winds SE 7kn	YP & IB
		0.1	2.92	835			Rough	
		0.5	2.88	756				
		1	2.83	680				
		2	2.69	487				
		3	2.43	270				
		4	2.32	209				
		5	2.13	134				
		6	2.05	113				
		7	1.86	72				
		8	1.72	53				
		9	1.60	40				
		10	1.48	30				
		10.5	1.34	22				
		in air	2.99	985				

Table 34 (continued)

DATE	TIME	DEPTH (m)	LOG LIGHT	LIGHT METER READING ($\mu Es^{-1}m^{-2}$)	SECCHI READING (m)	CLOUD COVER (%)	COMMENTS	RECORDER
28.04.98	940	in air	3.08	1195	1	40	Winds S 20Kn	YP & IB
		0.1	3.06	1148			Very rough	
		0.5	2.97	938			Very strong current	
		1	2.92	837				
		2	2.70	505				
		3	2.51	326				
		4	2.36	229				
		5	2.24	175				
		6	2.00	101				
		7	1.92	84				
		8	1.52	33				
		9	1.46	29				
		10	1.32	21				
		11	1.04	11				
		12	1.00	10				
		13	0.90	8				
		in air	3.08	1200				
5.05.98	905	in air	3.03	1079	2.5	60	Winds SE 5Kn	YP & IB
		0.1	3.03	1068			Moderate current	
		0.5	3.01	1030				
		1	2.89	781				
		2	2.53	338				
		3	2.32	209				
		4	2.25	179				
		5	2.15	140				
		6	2.03	107				
		7	1.92	83				
		8	1.81	64				
		9	1.68	48				
		10	1.53	34				
		10.5	1.34	22				
		in air	2.85	701				

NOTE: YP =Yvette Pedretti, IB = Ian Boyce
BB = Brad Barton, CS = Colleen Sims
JP = Jack Dekker, KB = Kevin Bancroft

APPENDIX 4

Light & Temperature Logger Data

(see attached disks)