

Forsmark site investigation

Measurement of phytobenthic production and respiration in shallow bays and shores in the Öregrundsgrepen area, Bothnian Sea

Results from measurements 2006

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December 2006

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Abstract

This document reports the results from measurements of phytobenthic production and respiration in shallow bays and along shores in the Öregrundsgrepen area, Bothnian Sea. This is one of the activities performed within the site investigation programme at Forsmark.

The primary aim of this investigation was to perform field measurements of oxygen concentrations and water temperatures in addition to collecting biomass samples. The data will be used to estimate the phytobenthic production and respiration of the investigated sites.

The phytobenthic plant and animal communities of the Bothnian Sea may contribute to over half of the total production of the coastal zone. The distribution and function of the phytobenthic plant and animal communities in the area is therefore of major importance for the understanding of processes within and in the vicinity of the candidate area.

Field work was performed during May, July and August 2006. The measurements and sampling were performed in different habitats, in shallow bays and along the coast of the Öregrundsgrepen area.

Measurements were carried out at in situ conditions with five transparent plexiglass chambers with logging devices, recording oxygen (mg/L) and temperature. The chambers were randomly placed on the substrate in the investigated stratum (plant community). With exception for the first sampling period, in May, data were logged during a 24 hours period, logging every 15 minutes. One logging unit was placed in the surrounding water at the same depth as the in situ chambers, as a reference. Divers collected quantitative samples from each of the five in situ chambers after termination of the logging activity.

The results generated by the logged in situ measurements will, together with biomass data, primarily be used for the estimation of phytobenthic production and respiration in the investigated areas. Daytime measurements provide net production values and nighttime measurements give respiration values.

The results are presented as graphs from each habitat and logging period in May, July and August.

Sammanfattning

I denna rapport presenteras resultaten från mätningar av fytobental produktion och respiration i grunda vikar och längs stränder i Öregrundsgrepen, Bottenhavet. Denna aktivitet är en av de undersökningar som genomförs inom det pågående platsundersökningsprogrammet i Forsmark.

Det primära syftet med denna undersökning var att genomföra fältmätningar av syrekoncentrationer och vattentemperaturer samt insamla biommassaprover. Insamlad data kommer att användas för beräkningar av fytobentalens produktion och respiration.

Fytobentalens växt- och djursamhällen i Bottenhavet kan bidra med över hälften av den totala produktionen i kustområdena. Utbredningen och funktionen av fytobentalens växt- och djursamhällen i närområdet är därför av stor betydelse för att förstå de ekologiska sambanden omkring kandidatområdet.

Fältarbete genomfördes under maj, juli och augusti 2006. Mätningar och provtagning utfördes i olika habitat i grunda havsvikar och längs stränder i Öregrundsgrepen.

Mätningarna utfördes under in situ förhållanden med fem genomskinliga plexiglasbehållare, utrustade med loggningsutrustning, som registrerade syre (mg/L) och temperatur. Behållarna utplacerades slumpmässigt på botten i det stratum (växtsamhälle) som skulle undersökas. Förutom den första mätomgången, i maj, lagrades data under 24 timmar med 15 minuters intervall. En loggningsutrustning placerades i omgivande vatten, på samma djup som in situ behållarna, och fungerade som referens. Dykare samlade in kvantitativa prover från var och en av de fem in situ behållarna efter mätningarna.

Resultaten som insamlats under in situ mätningarna kommer tillsammans med biomassdata i första hand att användas för beräkningar av fytobentalens produktion och respiration i de undersökta områdena. Mätningar under dagen ger nettoproduktion och mätningar under natten ger respiration.

Resultaten presenteras som figurer (grafer) från varje habitat och mätomgång under maj, juli och augusti.

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1 Introduction

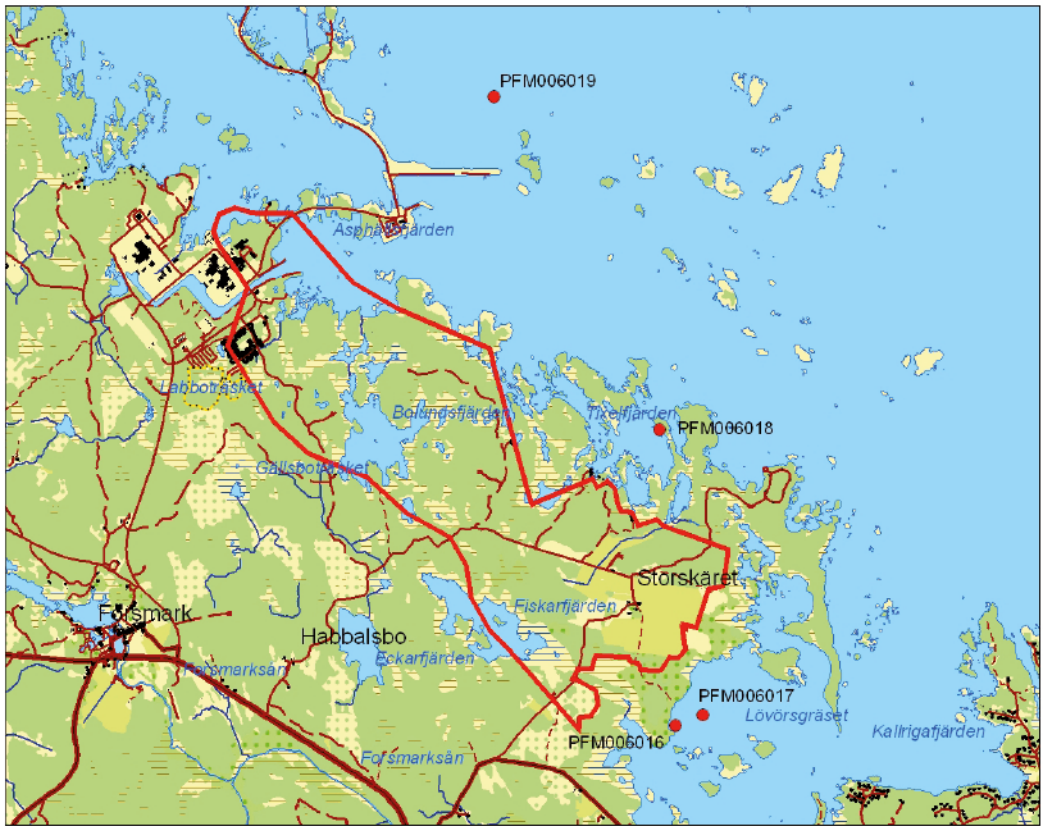
This document reports the results from measurements of phytobenthic production and respiration in shallow bays and along shores in the Öregrundsgrepen area, Bothnian Sea. This is one of the activities performed within the site investigation programme at Forsmark. The work was carried out in accordance with Activity Plan AP PF 400-06-001, see Table 1-1. The Activity Plan is an SKBs internal controlling document. All data generated were stored in the database SICADA and are traceable by the Activity Plan number.

The phytobenthic plant (flora) and animal (fauna) communities of the Bothnian Sea may contribute to over half of the total production of the coastal zone /1/. The distribution and function of the phytobenthic plant and animal communities in the area are therefore of major importance for the understanding of processes within and in the vicinity of the candidate area.

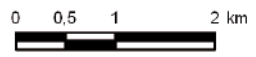
Field work was performed during May, July and August 2006. The measurements and sampling were performed in different habitats, in shallow bays and along the coast in the Öregrundsgrepen area, Figure 1-1.

Table 1-1. Controlling documents for performance of the activity.

Activity Plan	Number	Version
Mätning av marin bentisk produktion och respiration	AP PF 400-06-001	1.0



- Candidate area
- Sample point



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Figure 1-1. The measurement and sampling locations representing two bays and one coastal station.

2 Objective and scope

The primary aim of this investigation was to perform field measurements of oxygen concentrations, water temperatures and to collect biomass samples. The data will be used to estimate the phytobenthic production and respiration in shallow bays and along shores in the vicinity of the candidate area.

The investigations were performed in two shallow bays and at one coastal station in the vicinity of the candidate area, Figure 1-1. The sites were chosen to represent the dominating vegetation communities (cover degree and biomass) in the area, which were identified in an earlier investigation /2/.

Data describing production and respiration in the phytobenthic plant communities in the Grepen area are essential for modelling of the benthic ecosystem /3/, which is included in the Site investigation programme at Forsmark.

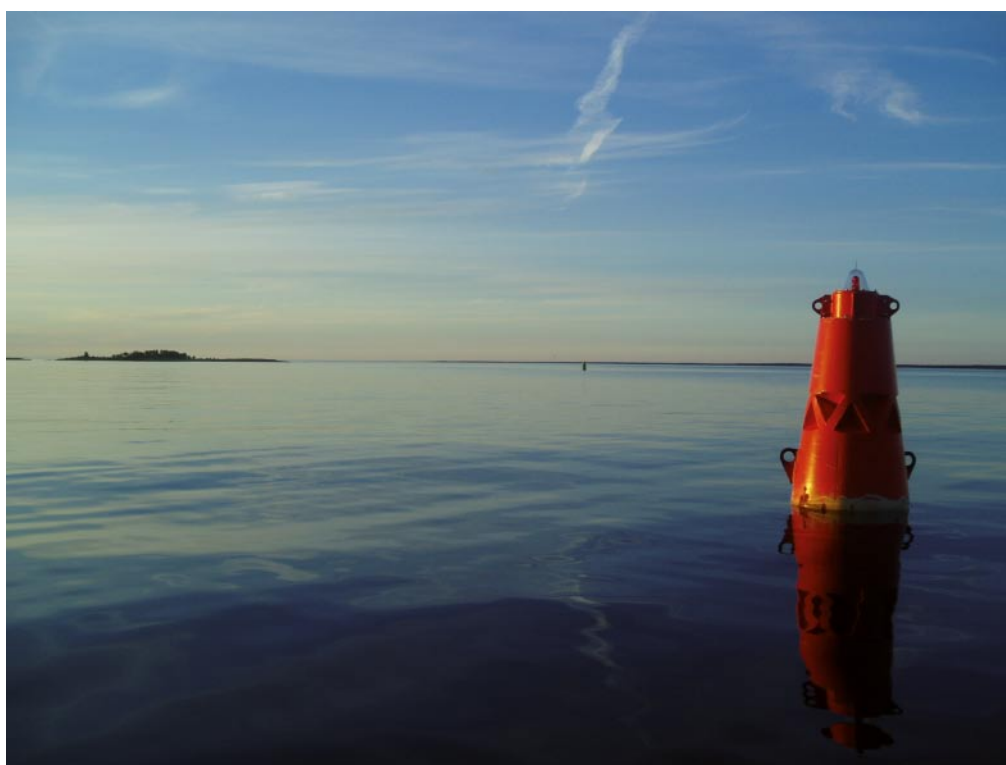


Figure 2-1. Station PFM006019 (Grynnan).

3 Equipment

3.1 Description of equipment tools

A schematic figure of the automatic oxygen logging in situ instrument set up is shown in Figure 3-1.

3.1.1 In situ chambers

Five 19.15 L (29×29 cm) transparent plexiglass chambers (enclosures) were used for the in situ measurements of oxygen and temperature. A tight removable lid with a hole for the probe/pump fitted each unit. For soft bottom substrate, an extra ring of plexiglass with coated web was used to prevent the unit from sinking into the seabed.

3.1.2 Oxygen units

Three types of oxygen measurement units were used: WTW (Oxi 330i, with probe Cellox 325), Hach-Lange (HQ10 with LDO-probe), and YSI (650MDS with probe 600QS). The YSI unit was only used for measurements in the surrounding water, as reference data. Three WTW units and four Hach-Lange units (two back up units) were available.

3.1.3 Flowpump unit

Five submersible pumps (Biltema submersible pump 12 V, 2 A, max flow 7.5 L/min, ABS-plastic) were connected to a central regulation unit which allowed a steady flow rate of approximately $1.0 \text{ L}\cdot\text{min}^{-1}$ for each pump. The pumps main function was to prevent a gradient build up in the chambers and to maintain a steady flow on the membrane type probes (WTW).

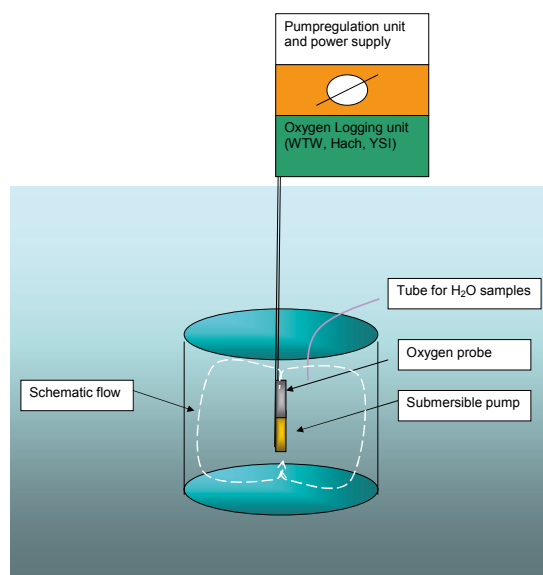


Figure 3-1. Schematic figure of the automatic oxygen logging in situ installation.

3.1.4 Light/PAR unit

Photosynthetic active radiation (PAR) was measured with an LiCor instrument (Li-1400, with probe Li 192). The probe was connected to a 10 m field cable.

3.1.5 GPS

The sampling point position was recorded by a Garmin 176C GPS /4/.

3.1.6 Depth gauge

Divers used a calibrated depth gauge with an average accuracy of ± 0.1 m. The water depth was measured from a boat using an echo sounder with an accuracy of ± 0.05 m.

3.1.7 Scraper, frame and net bag

A diver equipped with a scraper and an open iron frame (size 0.2×0.2 m) with an attached net bag was used to sample the benthic vegetation inside the cylinders, Figure 3-2.

3.1.8 Laboratory equipment

In the laboratory, the plants were assorted using a magnifying glass and a stereo microscope. The species were primarily identified with a stereo microscope and a light microscope. The organisms were dried in an oven (60°C) to a constant weight (a minimum of two weeks). The biomass was measured with an analytical balance (accuracy of ± 0.1 mg).



Figure 3-2. A bag attached to one open side of an ID-marked steel frame was used to collect the entire content within the in situ chambers.

4 Execution

Measurements and sampling of data for phytobenthic production and respiration estimates in the shallow bays and shores in the Grepen area, Bothnian Sea, were performed during the months May, July and August 2006, Table 4-1.

The measurements and sampling were performed in three different habitats (four locations during the first sampling period of May), in shallow bays and along the coast in the Öregrundsgrepen area. Measurements were carried out at in situ conditions with five 19.15 L (29×29 cm) transparent plexiglass chambers. The chambers were randomly placed on the bottom in the investigated stratum (plant community). The identification codes and sampling points are shown in Figure 1-1. The extent of the investigation is described in Table 4-2.

4.1 Preparations

Prior to the investigation, the logging and sampling equipment was calibrated and checked.

A field protocol was copied on plastic papers for field notes.

The GPS-units were calibrated at a special reference point in the area. The accuracy had to be within ± 5 m to be accepted.

Prior to the sampling period in July, all the logging devices and pumps were tested in an outside tube partly filled with plants (*Chara tomentosa*). During the 24 hours test the six instruments and pumps were logging every 15 minutes. The logged data were quality checked and transformed into a graph, Figure 4-1. This was done to substantiate that the different types of oxygen meters (YSI, WTW and Hach-Lange) gave the same readings and were reliable.

Table 4-1. Time schedule of the activity.

Year	2006	2006	2006
Month	May	July	August
Week	18	30	35

Table 4-2. The extent of the investigation.

Subject	Parameters	Unit	Performance	Extent/Number of samples	Comments
Water	Oxygen	mg O ₂ /L	Oxygen/temperature logging units	5 chambers + surrounding water in 3–4 habitats. Logging interval 15 minutes.	Archive samples (not analysed)
	Temperature	°C			
	Tot-N, tot-P, DOC	mg/L	Water samples	5 chambers + surrounding water in 3–4 habitat, before and after activity.	
Light	Photosynthetic active radiation (PAR)	$\mu\text{mol}\cdot\text{s}^{-1}\cdot\text{m}^{-1}$	Depth transect logging using LiCor instrument	In 3–4 habitat, before and after activity at 0.5 m interval down to bottom.	
Benthic vegetation	Biomass	g dw m ⁻²	Samples	5 chambers in 3–4 habitats.	
	Species	taxa	Samples	5 chambers in 3–4 habitats.	

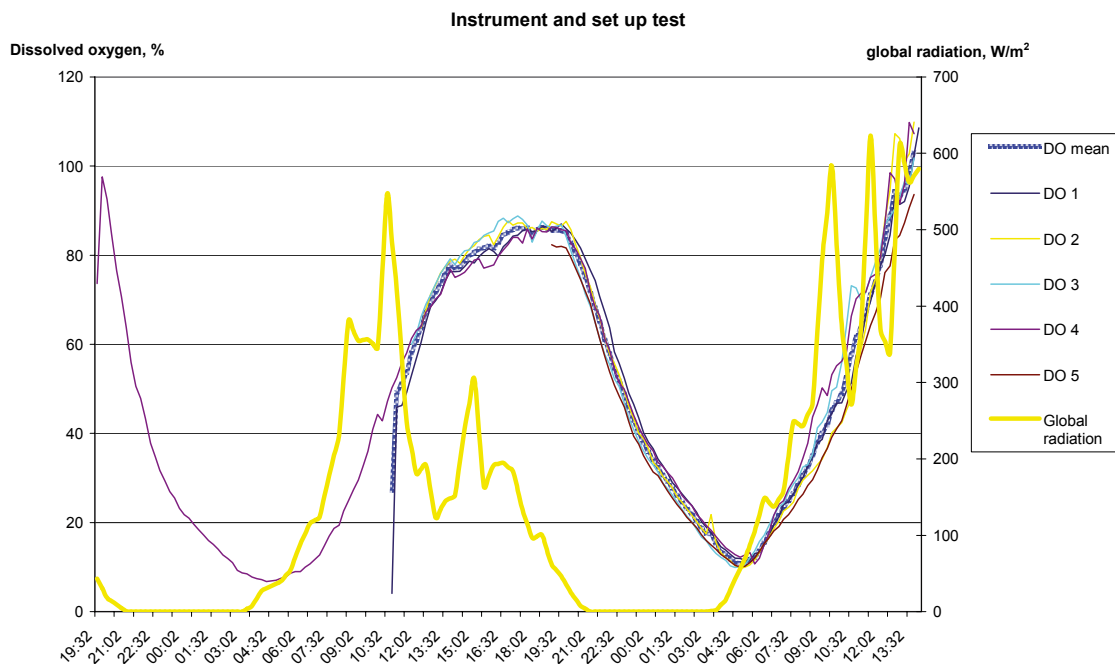


Figure 4-1. Instrument and set up test of the logging devices was performed in an outside tube partly filled with plants (*Chara tomentosa*). The results of the five logging oxygen instruments show a similar trend. Global radiation data from the measurement station Stormasten, PFM100700, (from <http://www.airviro.smhi.se/forsmark/>).

4.2 Execution of field work

The method used for the measurement and sampling of data, for phytobenthic production and respiration estimates, was a modified version of the method described in the Activity Plan, AP PF 400-06-001. The main difference was the logging setup with several units recording simultaneously and in parallel. The advantages with continuous logging were the receiving of data every 15 minutes and less disturbance from diving activity (e.g. particle sedimentation on the chambers).

4.2.1 Location of stations and sampling points

The locations of the investigated sites were not randomly placed but chosen to represent the dominating vegetation communities (cover degree and biomass) in the candidate area, which were identified in an earlier investigation /2/. The stations were placed and marked in advance on a navigation chart. The exact positions of the stations were then determined using a handheld GPS (Garmin 176C, ± 5 m precision), Table 4-3.

Table 4-3. The investigated benthic community, depth, station name, ID and position (GPS, RT 90-system).

Benthic community	Station depth	Name of station	ID code	Position (X)	Position (Y)	Comments
<i>Chara sp.</i>	1.0 m	Gåsören	PFM006016	6696160	1635155	
<i>Vaucheria sp.</i>	2.1 m	Gåsören	PFM006017	6696263	1635426	
Rooted plants (<i>Zannichellia sp.</i>)	1.5 m	Tixlan	PFM006018	6699140	1634991	Only measured once; in May
Red algae	5.2 m	Grynnan	PFM006019	6702489	1633327	

4.2.2 In situ measurements

Measurements were carried out at in situ conditions with five 19.15 L (29×29 cm) transparent plexiglass chambers. The five chambers were randomly placed on the seabed in the investigated stratum (plant community). The removable lid with the oxygen probe and submersible pump was attached on the chambers and connected via cables to the logging and pump regulation unit placed in a rubber boat, Figure 4-2. Except for the first sampling period, in May, the logging period was 24 hours, logging every 15 minutes. One logging unit (YSI) was placed in the surrounding water at the same depth as the in situ chambers, as a reference.

Most of the fieldwork had to be performed by divers. During the logging period divers checked the function of the submersible pumps and cleaned the in situ chamber lids from particles caused by sedimentation.

The logged data were transferred to a field computer (Laptop), quality checked and incorporated in the database SICADA.

4.2.3 Sampling of in situ chamber water and surrounding water

Water samples were taken before and after the in situ measurements in the chambers and in the surrounding water. Divers filled individually marked 60 ml syringes via a tube connected to the chamber, Figure 4-3.

4.2.4 Photosynthetic active radiation (PAR)

Photosynthetic active radiation (PAR) was measured at every 0.5 m down to the bottom in the surrounding water with a LiCor instrument before and after the in situ measurements, Figure 4-4. Some extra measurements were also performed during inspections of the logging instruments. The readings were noted on a field protocol, quality checked and transferred to SICADA.

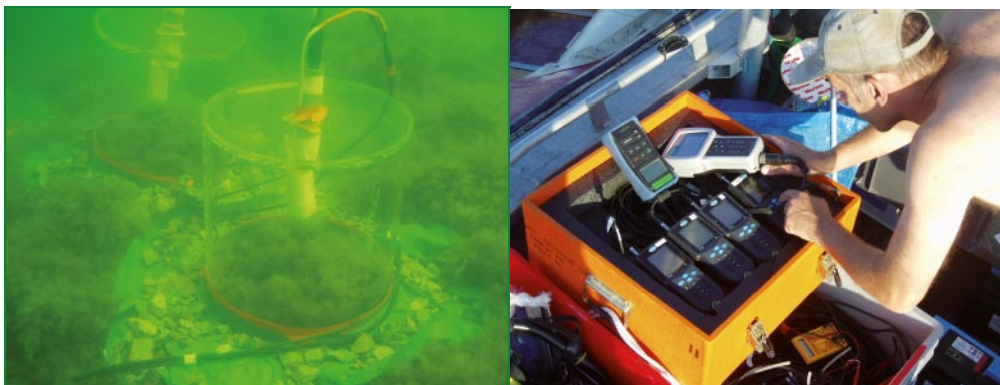


Figure 4-2. In situ measurements at “Grynnan”, July 2006, 5.2 m depth in the red algae strata, mainly *Polysiphonia fucoides*. For hard bottom substrates an extra ring of coated web was attached to prevent surrounding water to enter the enclosed system. Gravel, sand and stones were used as weights (left). The logging units were placed in a locked watertight box equipped with a sun powered cooling system (right).

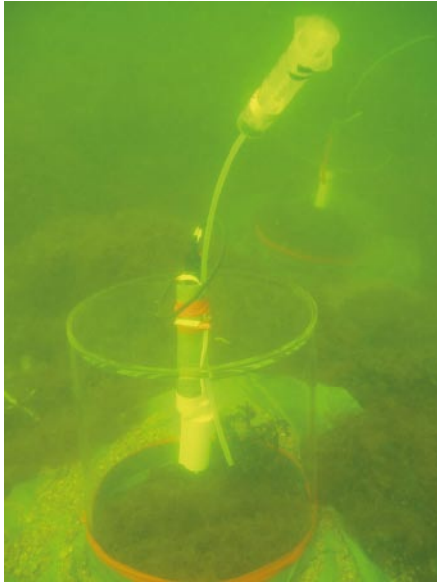


Figure 4-3. Syringes connected to a fixed tube was used to take water samples from the in situ chambers.



Figure 4-4. A stick was used during PAR measurements to prevent shadows from the boat influencing the readings (left). For the same reason the rubber boat used for the logging devices were anchored away from the in situ measurements (right).

4.2.5 Sampling of benthic vegetation

Divers collected quantitative samples from each of the five in situ chambers after termination of the logging activity. The entire content within the in situ chambers was scraped into a bag attached to one open side of the frame, Figure 3-2. The samples were analysed by sorting each species separately and drying (in 60°C) to a constant weight (a minimum of two weeks). If not otherwise stated in the text, biomass is given in g dry weight m⁻². Using these figures the benthic biomass net production can be calculated in terms of net production versus gram dry weight.

4.3 Sample preparation for further analysis

The water samples were transferred from the syringes to marked bottles and stored in a freezer. The benthic vegetation samples were transferred to plastic bags, marked and frozen for later sorting in the laboratory.

4.4 Data handling/post processing

When the activity was terminated, the field protocols were quality checked by the responsible personnel. Data from logging measurements and PAR-data, as well as background data, were incorporated in the database SICADA.

4.5 Analyses and interpretations

4.5.1 Benthic vegetation analysis

The benthic vegetation was sorted, measured and analysed by Micke Borgiel, Sveriges Vattenekologer AB, according to Swedish Environmental Protection Agency methodology standards /5/.

If possible, the plants were determined to species level using stereo and light microscopy. The samples were analysed by sorting each species separately. The biomass was then measured as dry weight (DW) on an analytical balance after drying in 60°C to a constant weight (at least for 2 weeks). The biomass is given in g dry weight m⁻². Using the biomass values, the production and respiration, which were measured per unit area, can be expressed per gram dry weight.

4.6 Nonconformities

4.6.1 Cancelled station

Measurement and sampling at point PFM006018, in Tixelfjärden, was excluded from the survey after the first sampling period in May. This station least resembled the common benthic habitat of the overall four stations. This decision was made to enable an extension of the logging period for each station to 24 hours while maintaining the budget to incorporate representative common benthic habitat stations.

Due to unstable weather conditions during the last sampling period, in August, the measurements and sampling at point PFM006019, Grynnan, were cancelled.

4.6.2 Comments and malfunction in logging devices

Comments and malfunctions of the logging devices during the measurements are listed in Table 4-4 below.

Table 4-4. Comments and malfunctions in logging devices.

Station	Object	May	July	August
PFM006016	Chamber 1	–	X	X
	Chamber 2	X	X	X
	Chamber 3	X	X	X
	Chamber 4	X	X	X
	Chamber 5	X	P	X
	Chamber 6	X	–	–
	Surrounding	X	X	X
PFM006017	Chamber 1	–	X	X
	Chamber 2	X	X	X
	Chamber 3	X	X	X
	Chamber 4	X	X	X
	Chamber 5	X	X	X
	Chamber 6	X	–	–
	Surrounding	X	X	X
PFM006018	Chamber 1	–	E	E
	Chamber 2	X	E	E
	Chamber 3	X	E	E
	Chamber 4	X	E	E
	Chamber 5	T	E	E
	Chamber 6	X	E	E
	Surrounding	X	E	E
PFM006019	Chamber 1	–	X	C
	Chamber 2	X	X	C
	Chamber 3	M	X	C
	Chamber 4	X	X	C
	Chamber 5	X	X	C
	Chamber 6	T	–	–
	Surrounding	X	X	C

Explanation to code/abbreviations:

X: Logging and data OK.

C: Measurement and sampling were cancelled due to poor weather conditions.

E: Station excluded.

M: Missing data.

P: Submersible pump out of order, clogged or broken.

T: No temperature values logged.

5 Results and discussion

The results generated by the logged in situ measurements will, together with biomass data, primarily be used for the estimation of phytoplankton production and respiration in the investigated areas. Primary data are compiled in Appendix 1–3. All data are stored in the primary database SICADA and for further interpretations (modelling) data from the database should be used. The data are traceable in SICADA by the Activity Plan number (AP PF 400-06-001).

5.1 In situ measurements of phytoplankton production and respiration

The results are displayed as figures in chronological order from May to August for each station. Primary data are compiled in Appendix 1.

Some of the figures show “peaks” for the oxygen values during the logging period which cannot be explained. It is most likely a malfunction in the oxygen measurement instruments, for example see chamber five in Figure 5-2.

The changes in oxygen level (mg/L) can be calculated as net production (NP) or respiration (R) per square meter and hour (mg O₂ m⁻² h⁻¹). Daytime measurements give NP values and night measurements give R values as follows:

$$NP = R = \left(\frac{\Delta C_{O_2} \cdot V}{A} \right) \cdot \frac{1}{T}$$

C_{O_2} = Oxygen concentration (mg/L)

V = Volume of the in situ chambers (L)

A = Area of the in situ chambers (m²)

T = Time interval for the measurements (h)

Gross production (GP) is calculated as:

$$GP = NP + R$$

The oxygen production (mg O₂ m⁻² h⁻¹) can be transformed into carbon assimilation (mg C m⁻² h⁻¹):

$$P_{carbon} = P_{oxygen} \times 0.3125 \text{ (recalculated from P/Q-ratio 1.2) } / 6/.$$

The volumes of the *in situ* chambers are given in Table 5-1.

The calculations of phytoplankton net production can be used further. In order to gain a figure which can be multiplied with measured global radiation and estimate the production for other time periods than those measured here, additional calculations have been performed. The difference in carbon assimilation over an hour (average of five replicates) is divided by the solar radiation accumulated during that period (15 minutes values extrapolated from measured average values for each half hour), and this is then expressed per unit area (m²) or per weight (g dw). Those data and figures (net production versus area and time) are presented in Appendix 4 and 5 but are not further interpreted or discussed in this report.

Table 5-1. Volumes in litres for the in situ chambers for each measurement.

Station	Volyme (L) of in situ chambers		Chamber number					
	Date		1	2	3	4	5	6
PFM 006016	May	–	19.15	19.15	19.15	19.15	19.15	19.15
	July	19.15	19.15	18.49	18.49	19.15	–	–
	August	18.49	18.49	18.49	19.15	18.49	–	–
PFM 006017	May	–	16.50	16.50	16.50	16.50	16.50	16.50
	July	16.50	16.50	16.50	16.50	16.50	–	–
	August	16.50	16.50	16.50	16.50	16.50	–	–
PFM 006018	May	–	18.49	19.15	18.49	18.49	17.82	–
	July	–	–	–	–	–	–	–
	August	–	–	–	–	–	–	–
PFM 006019	May	–	19.15	19.15	19.15	19.15	19.15	19.15
	July	19.15	19.15	19.15	19.15	19.15	–	–
	August	–	–	–	–	–	–	–

5.1.1 May PFM006016 (*Chara sp.*)

The results from the logged in situ measurements of oxygen and temperature are presented in Figure 5-1. The mean oxygen value decreased during nighttime and showed small differences during daytime.

The benthic vegetation biomass was low in spring. Only a few annual plants were observed at the station (*Chara aspera*, *Myriophyllum spicatum* and *Potamogeton pectinatus*). The samples from the in situ chambers were almost empty of benthic macrovegetation and contained mainly detritus (Appendix 2). This could explain the decreasing oxygen values. The surrounding water shows even lower oxygen values during the logging period in comparison to the chambers.

5.1.2 May PFM006017 (*Vaucheria sp.*)

The results from the logged in situ measurements of oxygen and temperature are shown in Figure 5-2. The mean oxygen value decreased both during night- and daytime logging. The significant decrease of oxygen around midnight corresponds to an increase of several degrees in water temperature during a short period in the night. Despite the calm weather and being in a shallow bay area, warm water flowed exterior to the chambers. The reason for the decreased oxygen values during this sampling period cannot be explained.

The mean biomass of benthic vegetation was high (295 g dw/m²), Figure 5-11. The samples from the in situ chambers were filled only with the filamentous algae *Vaucheria sp.*, a species mainly present in autumn and early spring /7/. The sampled algae was imbedded in the sediment rich soft bottom substrate, disabling an estimation of how much of the *Vaucheria sp.* was in its productive phase. The low transparency of the water, together with low biological activity from the *Vaucheria sp.* could explain the decreasing oxygen values. Again the surrounding water shows a higher decrease in oxygen values during the logging period. The significant oxygen decrease in chamber number three around noon, Figure 5-2, could have been caused by gas (methane/hydrogen sulphide) produced under decomposition of organic material. The gas may have disturbed the oxygen probes. The presence of gas was frequently observed by the divers in the area.

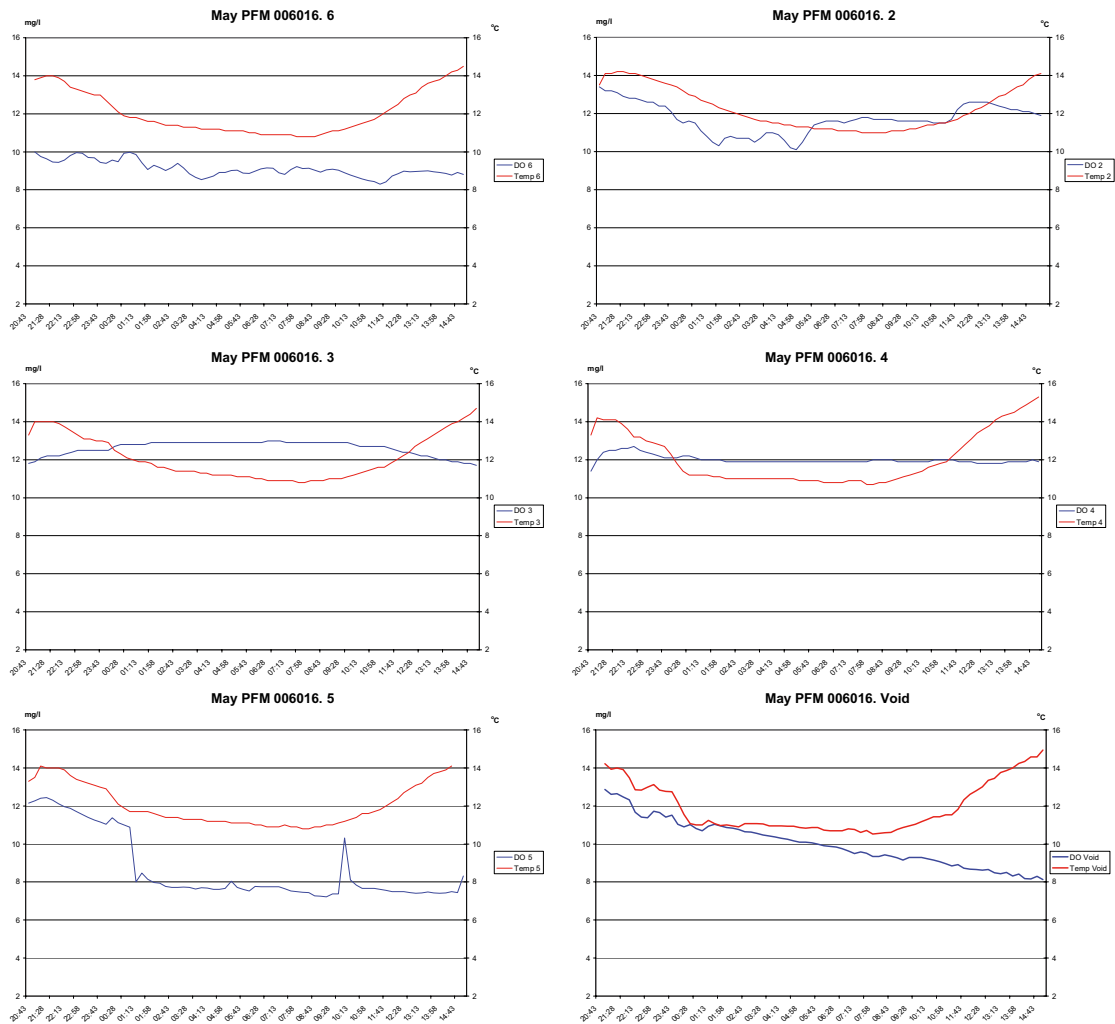
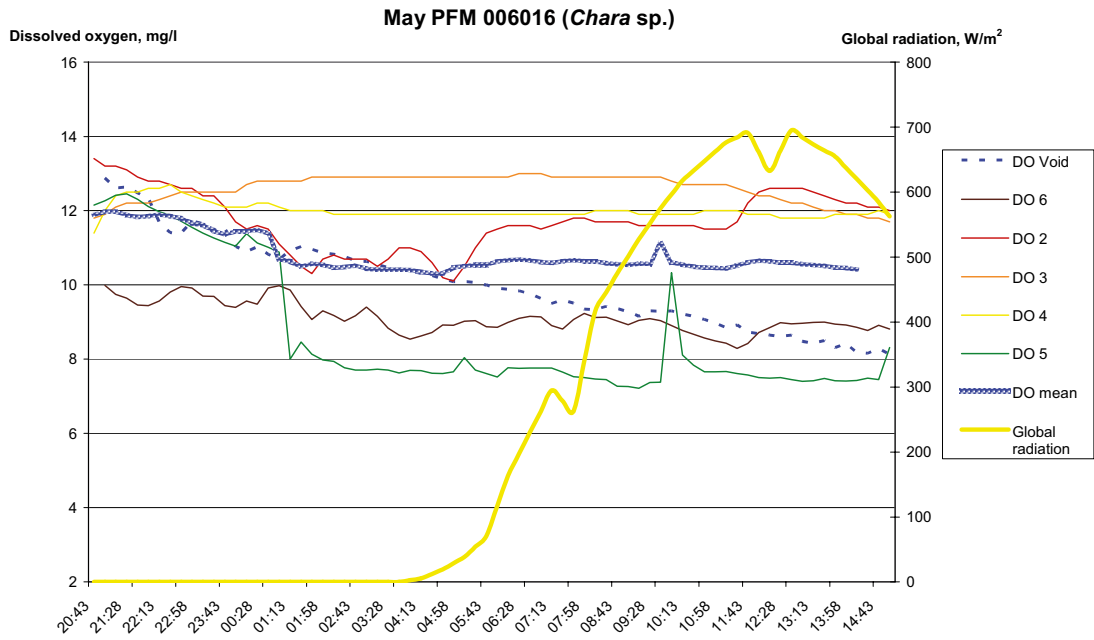


Figure 5-1. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 2–6), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m²) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

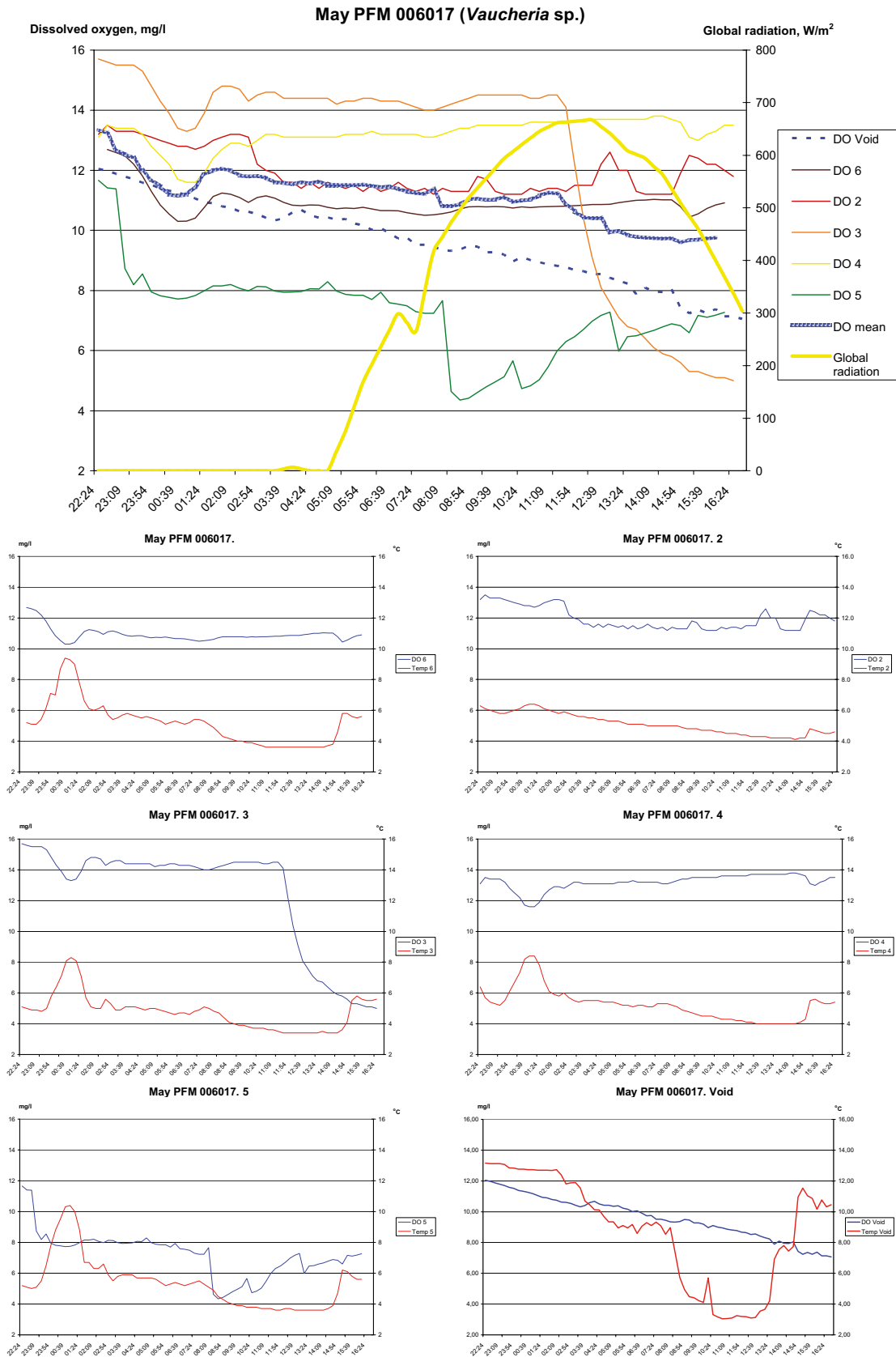


Figure 5-2. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 2–6), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m²) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

5.1.3 May PFM006018 (rooted plants)

The results from the logged in situ measurements of oxygen and temperature are shown in Figure 5-3. The oxygen mean value was slowly decreasing during the night loggings and slowly increased during the daytime. The oxygen start and stop values were similar which indicates a system in balance. The surrounding water shows a slight increase in the oxygen level during the logging period.

The biomass of benthic vegetation was very low. Only a few annual plants were observed at the station. The samples from the in situ chambers were empty of benthic macrovegetation or contained solely sparse detritus (Appendix 2). The small increase and decrease of oxygen values during the logging period were probably due to production and respiration by phytoplankton and microphytobenthos. Temperature logging data are missing from chamber number five. The values presented in the figure are mean temperature values from the four other chambers.

Measurements and sampling at point PFM006018, in Tixelfjärden, were excluded from the survey after the first sampling period, in May, see Section 4.6.1, Cancelled station.

5.1.4 May PFM006019 (red algae)

The results from the logged in situ measurements of oxygen and temperature are shown in Figure 5-4. The dissolved oxygen mean value was slowly decreasing during the night and slowly increased during the daytime. The surrounding water shows the same pattern during the logging period.

The biomass of benthic vegetation was moderate (116 g dw/m²), Figure 5-11. The samples from the in situ chambers were covered with 75–100% perennial red algae and brown algae, bladder wrack, (*Polysiphonia fucoides*, *Furcellaria lumbricalis* and *Fucus vesiculosus*). In one of the chambers (no. 6) small amounts of moss (*Fontinalis* sp.) were present. The depth (5 m) together with low water temperature may be some of the reasons for the low biological activity during the logging period. No data were recorded from chamber 3 due to a malfunction in the logging device. Temperature logging data are missing from chamber 6. The values presented in the figure are mean temperature values from the four remainder chambers.

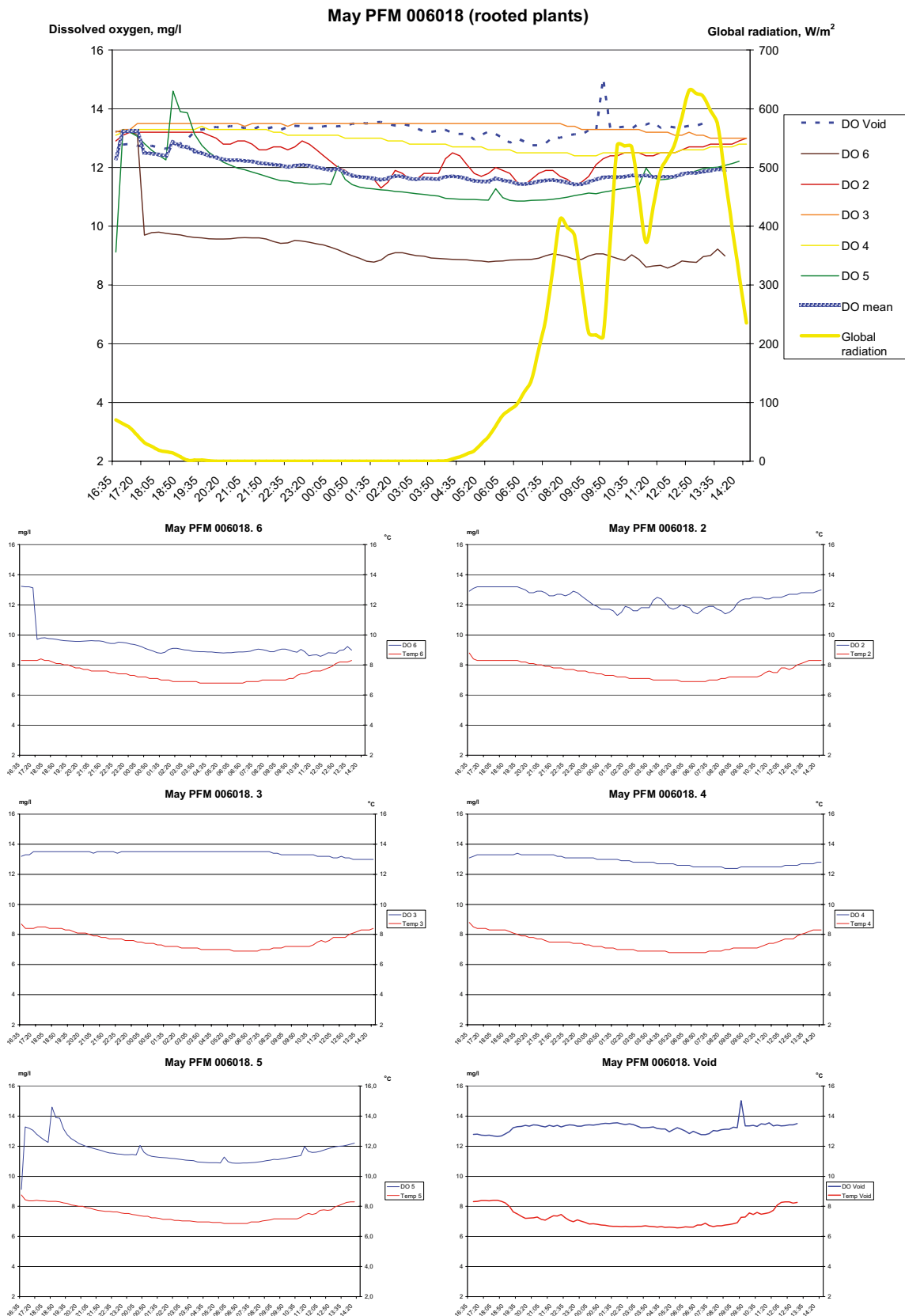


Figure 5-3. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 2–6), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m^2) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

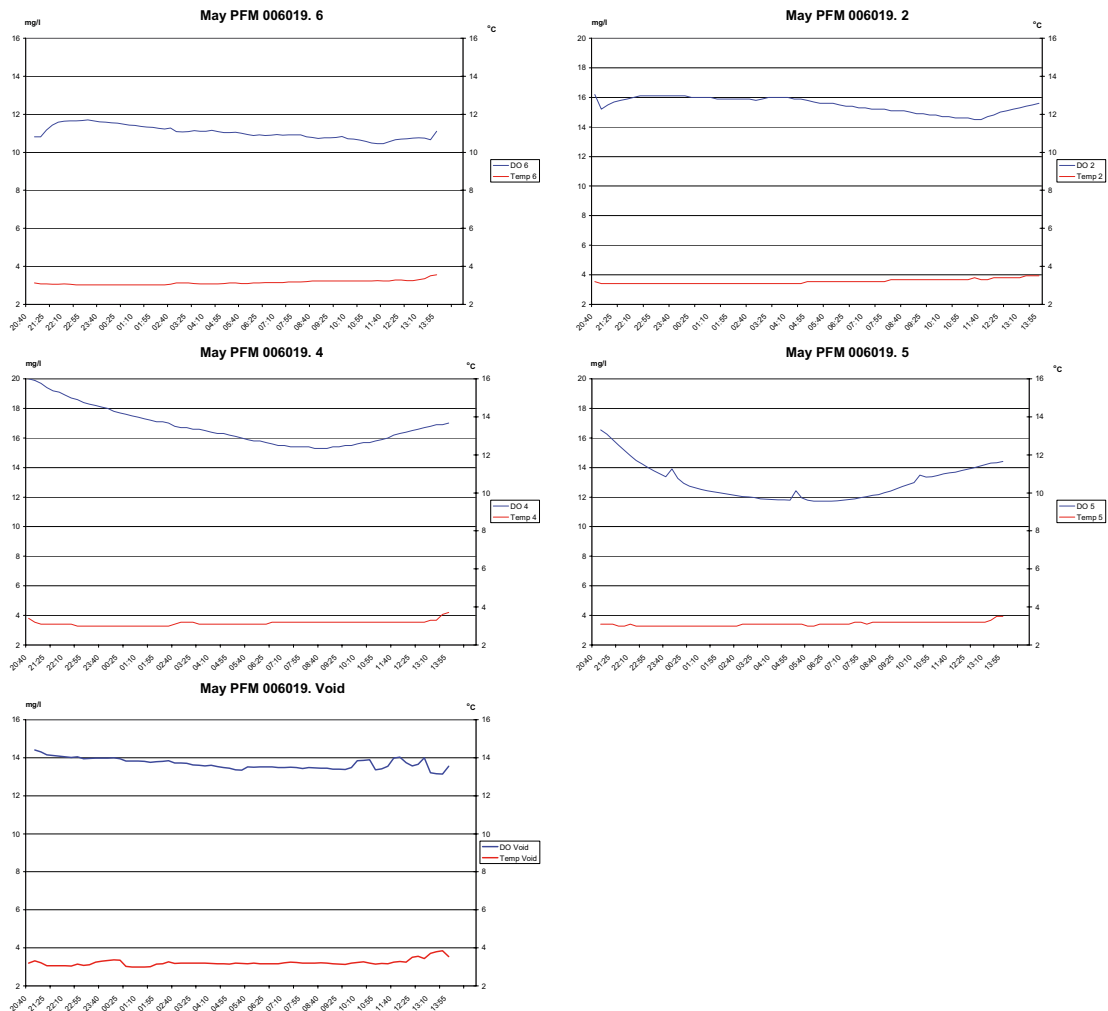
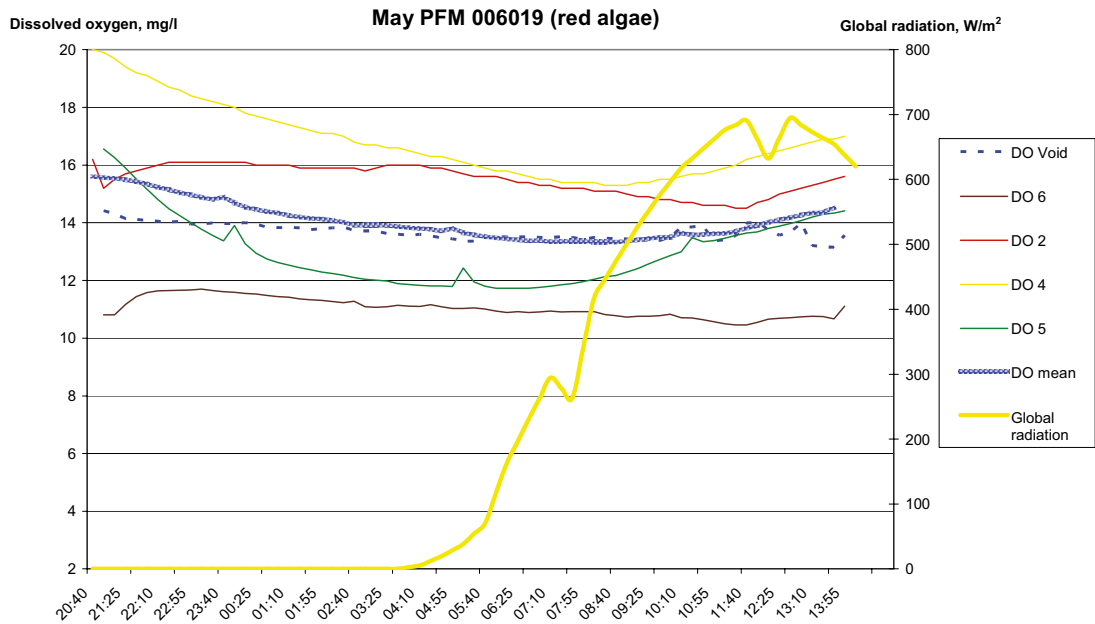


Figure 5-4. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 2–6), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m^2) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

5.1.5 July PFM006016 (*Chara* sp.)

The results from the logged in situ measurements of oxygen and temperature are presented in Figure 5-5. The dissolved oxygen mean value was decreasing during the night and increased during the daytime logging period. The significant increase of dissolved oxygen around 9.00 am corresponds to the increase of global radiation.

The coverage of benthic vegetation was high, around 50–75% cover in the area. The mean biomass of benthic vegetation was low (44 g dw/m², Figure 5-11) compared with earlier studies in the area /2/. The samples from the in situ chambers were also covered (50–75%) with the charophyte (*Chara aspera*). In one chamber (no. 5), the rooted plant *Potamogeton Pectinatus* (sw. borstnate) was also present. Summer conditions with many hours of global radiation in combination with shallow (1 m depth) warm water contributed to high biological activity.

A comparison between the in situ chambers and the surrounding water (void) shows no significant difference in water temperature, which means no detected “green house effect” in the chambers.

The submersible pump in in situ chamber 5 stopped (broke) at 18.22 pm and was replaced with a spare pump which started pumping 23.07 pm. The importance of a steady flow rate is clearly seen in the figure, Figure 5-5.

The steep decrease and late increase of dissolved oxygen in chamber four are difficult to explain. The biomass in the chamber was average and no oxygen consuming detritus was detected in the sample. The probe used was of the optical type (Hach-Lange) which does not require a constant water flow to function. A probable explanation is that the submersible pump stopped, or got blocked, for a while and started again. During that time an oxygen gradient was created in the chamber.

July PFM 006016 (*Chara* sp.)

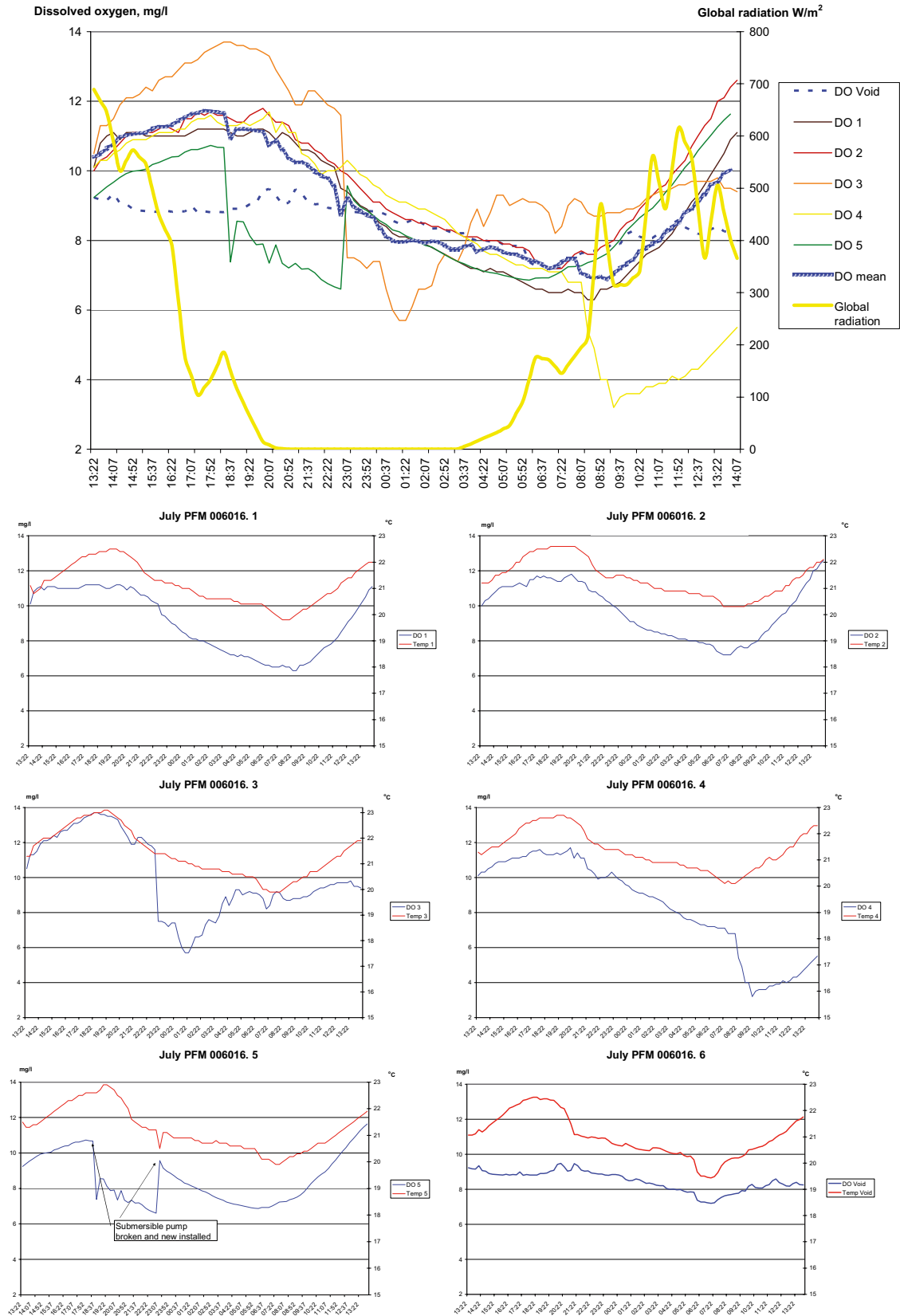


Figure 5-5. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 2–6), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m^2) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

5.1.6 July PFM006017 (*Vaucheria sp.*)

The results from the logged in situ measurements of oxygen and temperature are presented in Figure 5-7. The logging period was extended to 36 hours. The dissolved oxygen mean value was decreasing at night and increasing during the day logging period. The significant increase of dissolved oxygen around 11 am corresponds well to the maximum global radiation that day. The reason for the late dissolved oxygen increase, despite sunrise at around 03.30 am (summertime), was the low transparency of the water. The photosynthetic active radiation (PAR) measurements showed low values at the bottom (2 m depth), Figure 5-6.

The surrounding water showed similar dissolved oxygen and temperature values during the logging period.

The coverage and biomass of benthic vegetation was very high (580 g dw/m²), Figure 5-11, and in accordance with earlier studies in this area [2]. The samples from the in situ chambers were covered (100%) with the filamentous algae *Vaucheria sp.*. The sampled algae were imbedded in the sediment rich soft bottom, disabling to estimate how much of the *Vaucheria sp.* was in its productive phase.

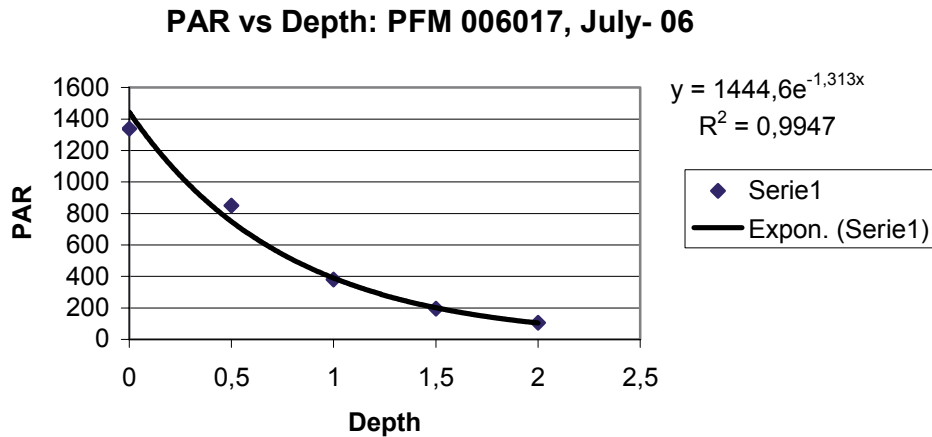


Figure 5-6. The photosynthetic active radiation (PAR, $\mu\text{mol m}^{-2}\text{s}^{-1}$) versus depth (m) measurements, July 26th 2006 (15.45 pm), shows the rapid decrease of PAR, which results in a late start of production in the *Vaucheria sp. strata*.

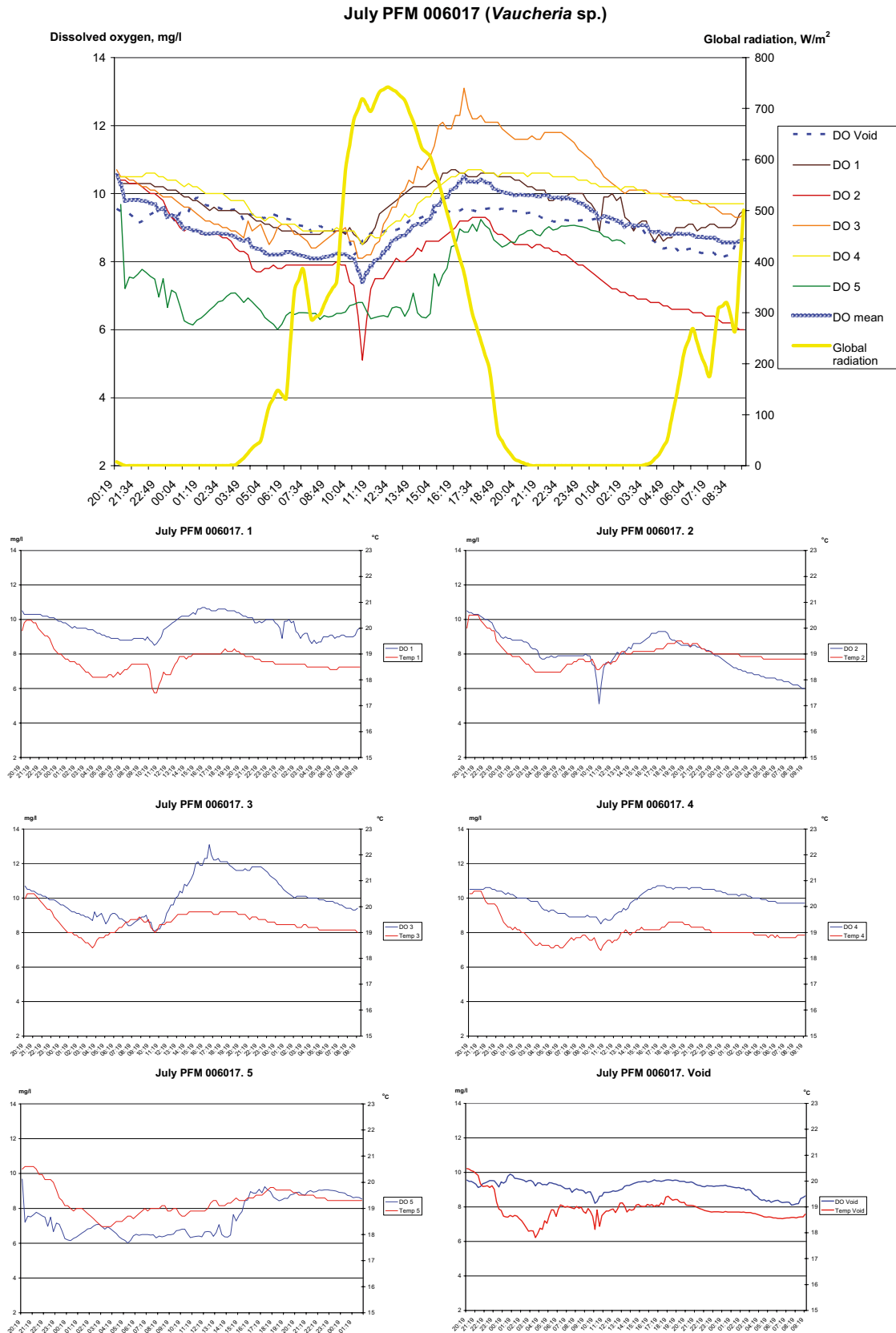


Figure 5-7. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 1–5), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m²) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

5.1.7 July PFM006019 (red algae)

The results from the logged in situ measurements of oxygen and temperature are presented in Figure 5-8. The dissolved oxygen mean value decreased at night and increased during the daytime. The graphs show high biological activity (production and respiration) in all the in situ chambers. The dissolved oxygen start and stop values during the 24 hour logging period are similar which exhibits a system in balance. The surrounding water showed more or less the same values during the logging period, which are natural in the open sea, due to currents.

The coverage and biomass of benthic vegetation was lower in July (91 g dw/m²) than in May (116 g dw/m²), Figure 5-11. This is mainly due to the samples in May containing more bladder wrack (*Fucus vesiculosus*), 51% of the mean biomass in contrast to 7% in July.

The samples from the in situ chambers were in average covered with 75% perennial and annual red algae and brown algae, bladder wrack, (*Polysiphonia fucoides*, *Furcellaria lumbricalis*, *Ceramium gobi* and *Fucus vesiculosus*). In one of the chambers (no. 2) small amounts of moss (*Fontinalis* sp.) were present. High water temperature is one of the probable causes for the high biological activity during the logging period.

The steep decrease and increase in chamber 4 are hard to explain. The opposite was expected, because the sample from this chamber had the lowest biomass (57 dw g/m²), 63% of the mean biomass. Therefore the decrease and increase rate of dissolved oxygen values (respiration and production) was expected to be lower than the other chamber readings. We cannot explain this.

5.1.8 August PFM 006016 (*Chara* sp.)

The results from the logged in situ measurements of oxygen and temperature are shown in Figure 5-9. The dissolved oxygen mean value decreased during the night and then increased during the day logging period. The significant increase of dissolved oxygen around 07.00 am corresponds again to the increase of global radiation. Comparison with the figure from July (Figure 5-5) shows a similar trend and values. Even the slopes of the dissolved oxygen mean values are similar which indicates that the production and respiration rate were the same during July and August.

The coverage of benthic vegetation was high, around 50–75% on average in the area. The biomass of benthic vegetation was still low (31 g dw/m²), even lower than July values, Figure 5-11. The samples from the in situ chambers were covered (50–75%) with the charophyte (*Chara aspera*) and a few small individuals of rooted plants *Potamogeton pectinatus* (sw. borstnate). Summer conditions with several hours of global radiation and shallow (1 m depth) warm water contributed to high biological activity in the plants.

July PFM 006019 (red algae)

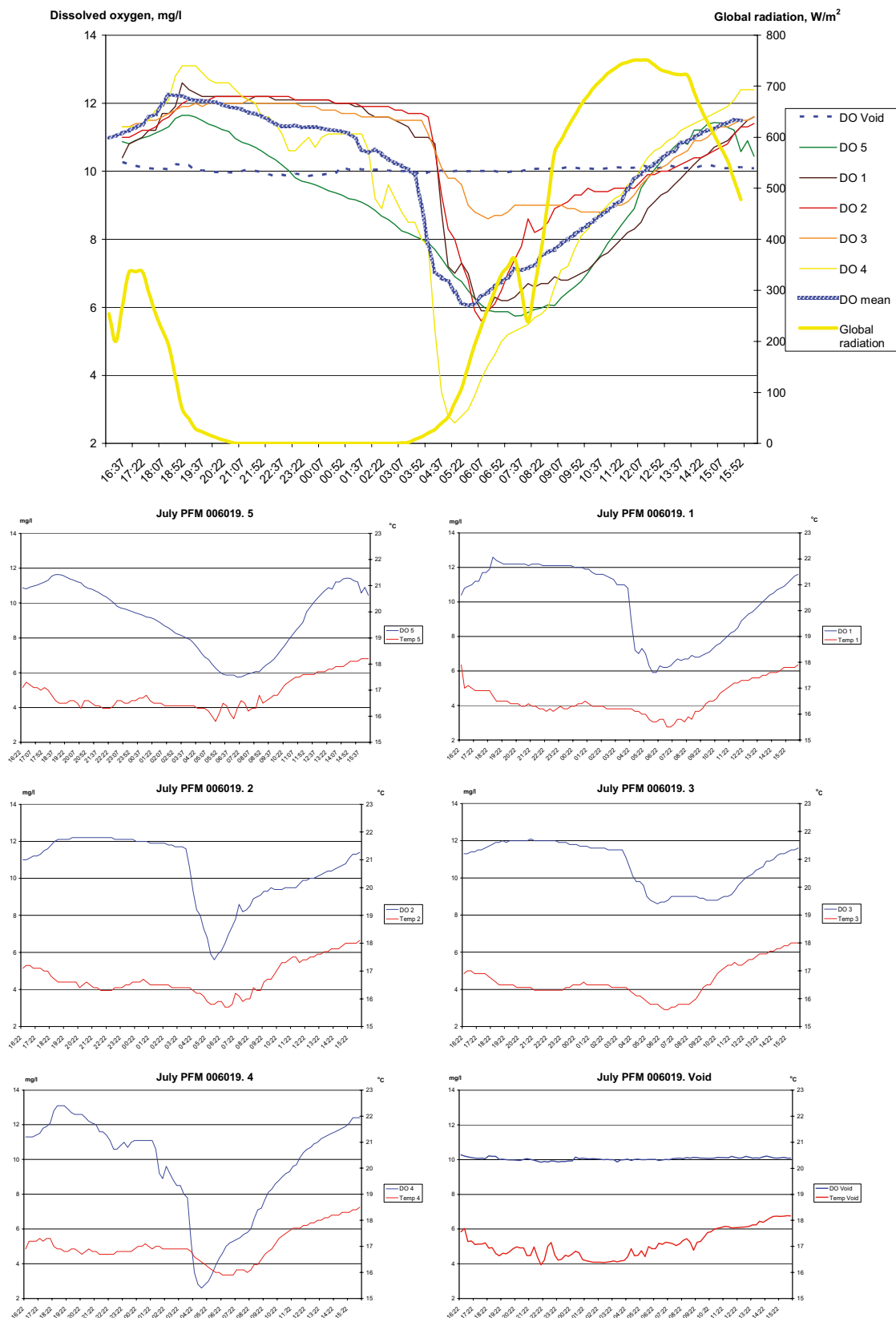


Figure 5-8. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 1–5), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m^2) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

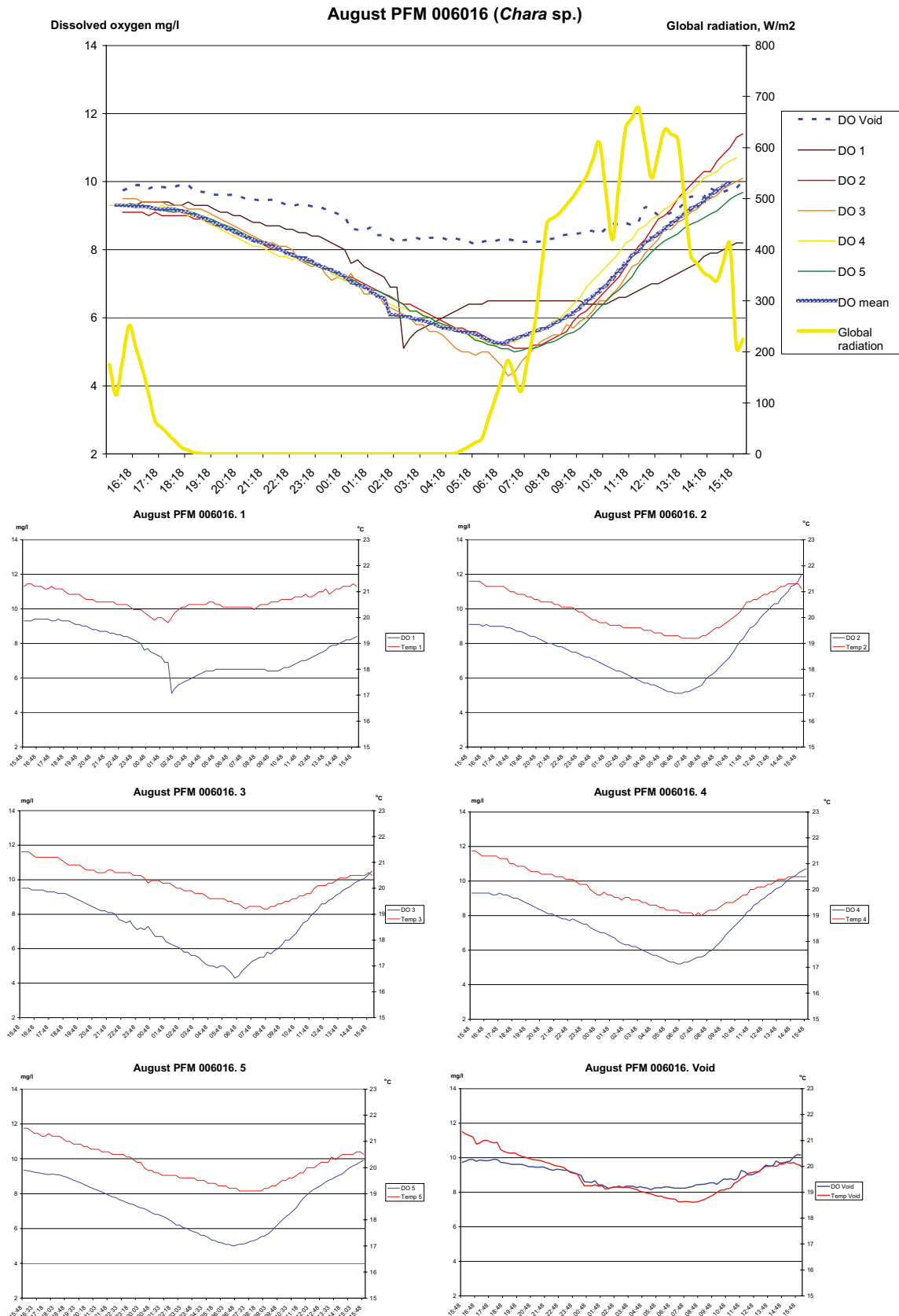


Figure 5-9. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 1–5), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m^2) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

5.1.9 August PFM006017 (*Vaucheria* sp.)

The results from the logged in situ measurements of oxygen and temperature are shown in Figure 5-10. The dissolved oxygen mean value decreased at night and continued to decrease until 10.00 am. The significant increase in dissolved oxygen around 11.00 am corresponds with the maximum global radiation recordings that day. The reason for the late dissolved oxygen increase, despite sunrise (global radiation) at around 06.00 am (summertime), was for the same reason as in July, the low transparency of the water. The photosynthetic active radiation (PAR) measurements showed low values at the bottom (2 m depth). The PAR values were only 13% (14% in July) of the surface values on 2.0 m depth (bottom), for figures see Appendix 3.

The surrounding water showed similar temperature values during the logging period, but the decrease and increase in dissolved oxygen values were less significant.

The benthic vegetation biomass remained high (493 g dw/m²), but lower than the July value, Figure 5-11. The in situ chambers were covered (100%) with the filamentous algae *Vaucheria* sp.. A few small individuals of rooted plants *Potamogeton perfoliatus* (sw. ålnate) were also present in chambers 4 and 5.

The sampled algae were imbedded in the sediment rich soft bottom, thus disabling estimations of how much of the *Vaucheria* sp. was in its productive phase.

5.1.10 August PFM006019 (red algae)

In situ measurements and sampling were cancelled at station PFM006019, “Grynnan” in August, due to unstable weather conditions (gale warning).

5.2 Biomass of benthic vegetation in the in situ chambers

The results are presented in Figure 5-11 in chronological order from May to August for each station. Primary data are compiled in Appendix 2. The results are further discussed in Section 5.1.

5.3 Measurements of photosynthetic active radiation (PAR) and water transparency

The results are presented in Appendix 3 in chronological order from May to August for each station. The results are further discussed in Section 5.1.

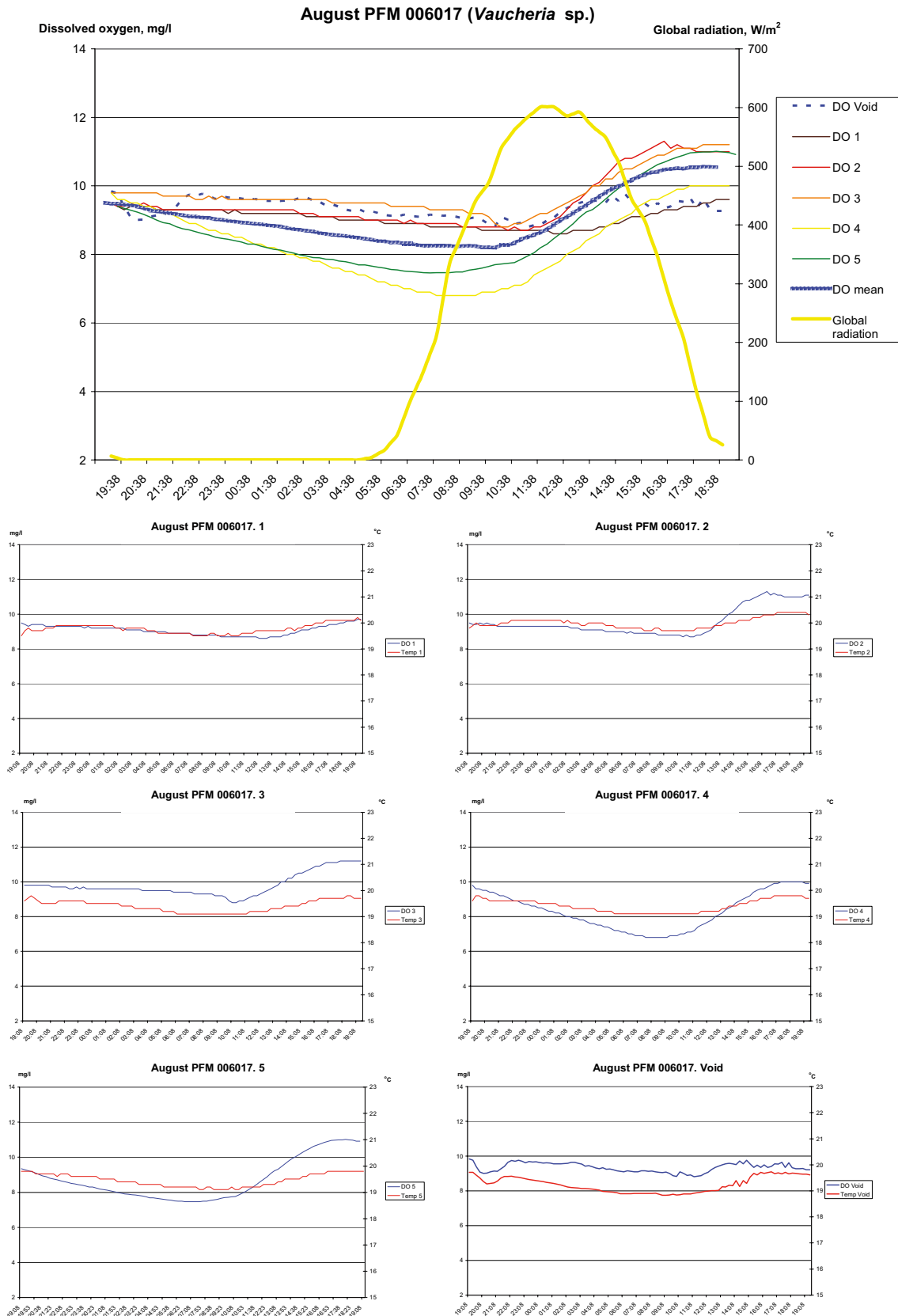


Figure 5-10. The main figure shows the dissolved oxygen levels (DO, mg/L) for each in situ chamber (DO 1–5), the surrounding water (void), the mean value from the five in situ chambers (DO mean) and the global radiation (W/m²) (from <http://www.airviro.smhi.se/forsmark/>). The six miniature figures display the logged in situ measurements of oxygen and temperature for each chamber and the surrounding water (Red=Temperature, Blue= Dissolved oxygen).

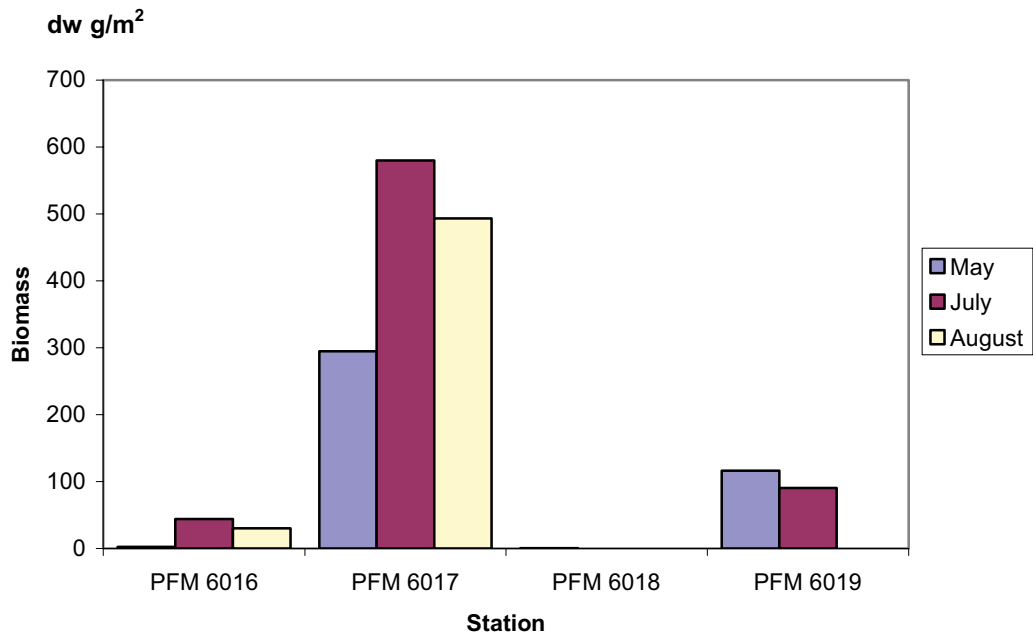


Figure 5-11. Mean biomass in the in situ chambers for each station and sampling period.

References

- /1/ **Kautsky U, Kautsky H, 1995.** Production and nutrient dynamics of coastal vegetation covered bottoms of the Baltic Sea. In: Eleftheriou A, A Ansell, A & C Smith J: Biology and Ecology of Shallow Coastal Waters. 28th EMBS, Crete 23–28th Sept 1993, Olsen & Olsen. pp 31–38.
- /2/ **Borgiel M, 2004.** Benthic vegetation, plant associated macrofauna and benthic macrofauna in shallow bays and shores in the Grepen area, Bothnian Sea. SKB P-05-135, Svensk Kärnbränslehantering AB.
- /3/ **Lindborg T, (ed) 2005.** Description of surface systems. Preliminary site description Forsmark area – version 1.2. SKB R-05-01. Svensk Kärnbränslehantering AB.
- /4/ **Garmin GPS MAP, 176C/176 2001.** Svensk Handbok.
- /5/ **Naturvårdsverket.** Handbok för miljöövervakning, Kust och hav. Vegetationsklädda bottnar, ostkust Version 1: 2004-04-27.
- /6/ **Gutenstam B, 1979.** In situ Untersuchungen über Sauerstoffumsatz and Energiefluss in Fucus-Gemeinschaften der Ostsee. Rep. Sonderforschungsbereich 95 Wechselwirkung Meer-Meeressboden, University Kiel 49 151 pp.
- /7/ **Tolstoy A, Österlund K, 2003.** Alger vid Sveriges östersjökust. Artdatabanken, Sveriges Lantbruksuniversitet, Uppsala.

Plant biomass data from the in situ measurements of May–August 2006

May

Biomass (g dw/m²) in *in situ* chambers.

Area	Gåsören (1.0 m)					
SICADA ID-number	PFM 006016 (<i>Chara sp.</i>)					
Date	2006-05-05					
In situ chamber number	2	3	4	5	6	Mean
Taxa/Species						
Characeae						
<i>Chara aspera</i>	0.44	0.00	0.00	0.57	0.00	0.20
Phanerogames						
<i>Myriophyllum spicatum</i>	0.00	0.00	0.00	2.06	0.00	0.41
<i>Potamogeton pectinatus</i>	0.54	0.64	6.49	0.43	0.60	1.74
Other						
<i>Detritus</i>	2.47	8.97	0.00	2.21	4.20	3.57
Sum biomass (detritus excluded)	0.98	0.64	6.49	3.05	0.60	2.35
Sum (detritus included)	3.45	9.61	6.49	5.27	4.80	5.92

Biomass (g dw/m²) in *in situ* chambers.

Area	Gåsören (2.1 m)					
SICADA ID-number	PFM 006017 (<i>Vaucheria sp.</i>)					
Date	2006-05-06					
In situ chamber number	2	3	4	5	6	Mean
Taxa/Species						
Vaucheriales						
<i>Vaucheria sp.</i>	529.71	280.35	228.66	214.86	219.97	294.71
Sum biomass (detritus excluded)	529.71	280.35	228.66	214.86	219.97	294.71
Sum (detritus included)	529.71	280.35	228.66	214.86	219.97	294.71

Biomass (g dw/m²) in *in situ* chambers.

Area	Tixelfjärden (1.5 m)					
SICADA ID-number	PFM 006018 (Rooted plants)					
Date	2006-05-03					
In situ chamber number	2	3	4	5	6	Mean
Taxa/Species						
Other						
<i>Detritus</i>	0.00	0.00	0.00	0.58	0.00	0.12
Sum biomass (detritus excluded)	0.00	0.00	0.00	0.00	0.00	0.00
Sum (detritus included)	0.00	0.00	0.00	0.58	0.00	0.12

Biomass (g dw/m²) in *in situ* chambers.

Area	Grynnan (2.1 m)					
SICADA ID-number	PFM 006019 (Red algae)					
Date	2006-05-04					
In situ chamber number	2	3*	4	5	6	Mean**
Taxa/Species						
Red						
<i>Furcellaria lumbricalis</i>	10.36	0.00	4.43	0.00	0.00	3.70
<i>Polysiphonia fucoides</i>	34.06	27.14	52.97	53.33	71.02	52.85
Brown						
<i>Fucus vesiculosus</i>	66.09	617.50	138.83	34.15	0.00	59.77
Phanerogames						
<i>Fontinalis sp.</i>	0.00	0.00	0.00	0.00	0.21	0.05
Sum biomass (detritus excluded)	110.52	644.64	196.23	87.49	71.23	116.37
Sum (detritus included)	110.52	644.64	196.23	87.49	71.23	116.37

* Note. No in situ measurement data logged due to malfunction in the logger unit.

** Chamber Nr 3 is excluded from the mean value (see above).

July

Biomass (g dw/m²) in *in situ* chambers.

Area	Gåsören (1.0 m)					
SICADA ID-number	PFM 006016 (<i>Chara sp.</i>)					
Date	2006-07-28					
In situ chamber number	1	2	3	4	5	Mean
Taxa/Species						
Characeae						
<i>Chara aspera</i>	29.79	62.09	55.49	30.63	37.82	43.16
Phanerogames						
<i>Potamogeton pectinatus</i>	0.00	0.00	0.00	0.00	5.52	1.10
Sum biomass (detritus excluded)	29.79	62.09	55.49	30.63	43.35	44.27
Sum (detritus included)	29.79	62.09	55.49	30.63	43.35	44.27

Biomass (g dw/m²) in *in situ* chambers.

Area	Gåsören (2.1 m)					
SICADA ID-number	PFM 006017 (<i>Vaucheria sp.</i>)					
Date	2006-07-27					
In situ chamber number	1	2	3	4	5	Mean
Taxa/Species						
Vaucheriales						
<i>Vaucheria sp.</i>	455.52	779.09	592.24	494.67	577.61	579.83
Sum biomass (detritus excluded)	455.52	779.09	592.24	494.67	577.61	579.83
Sum (detritus included)	455.52	779.09	592.24	494.67	577.61	579.83

Biomass (g dw/m²) in *in situ* chambers.

Area	Grynnan (2.1 m)					
SICADA ID-number	PFM 006019 (Red algae)					
Date	2006-07-25					
In situ chamber number	1	2	3	4	5	Mean
Taxa/Species						
Red						
<i>Ceramium gobi</i>	0.41	0.00	0.00	0.00	0.00	0.08
<i>Furcellaria lumbricalis</i>	48.44	20.14	0.00	2.06	5.09	15.15
<i>Polysiphonia fucoides</i>	85.37	74.85	51.44	54.52	78.45	68.92
Brown						
<i>Fucus vesiculosus</i>	0.00	4.66	17.08	0.27	9.30	6.26
Phanerogames						
<i>Fontinalis sp.</i>	0.00	1.04	0.00	0.00	0.00	0.21
Sum biomass (detritus excluded)	134.21	100.68	68.52	56.85	92.84	90.62
Sum (detritus included)	134.21	100.68	68.52	56.85	92.84	90.62

August

Biomass (g dw/m²) in *in situ* chambers.

Area	Gåsören (1.0 m)					
SICADA ID-number	PFM 006016 (<i>Chara sp.</i>)					
Date	2006-08-29					
In situ chamber number	1	2	3	4	5	Mean
Taxa/Species						
Characeae						
<i>Chara aspera</i>	29.44	33.11	28.87	29.97	29.33	30.14
Phanerogames						
<i>Potamogeton pectinatus</i>	0.00	2.98	0.00	0.00	0.00	0.60
Sum biomass (detritus excluded)	29.44	36.09	28.87	29.97	29.33	30.74
Sum (detritus included)	29.44	36.09	28.87	29.97	29.33	30.74

Biomass (g dw/m²) in *in situ* chambers.

Area	Gåsören (2.1 m)					
SICADA ID-number	PFM 006017 (<i>Vaucheria sp.</i>)					
Date	2006-08-30					
In situ chamber number	1	2	3	4	5	Mean
Taxa/Species						
Vaucheriales						
<i>Vaucheria sp.</i>	400.56	459.18	625.19	474.25	490.00	489.84
Phanerogames						
<i>Potamogeton perfoliatus</i>	0.00	0.00	0.00	5.36	11.65	3.40
Sum biomass (detritus excluded)	400.56	459.18	625.19	479.61	501.65	493.24
Sum (detritus included)	400.56	459.18	625.19	479.61	501.65	493.24

Appendix 3

Measurements of photosynthetic active radiation (PAR) and water transparency

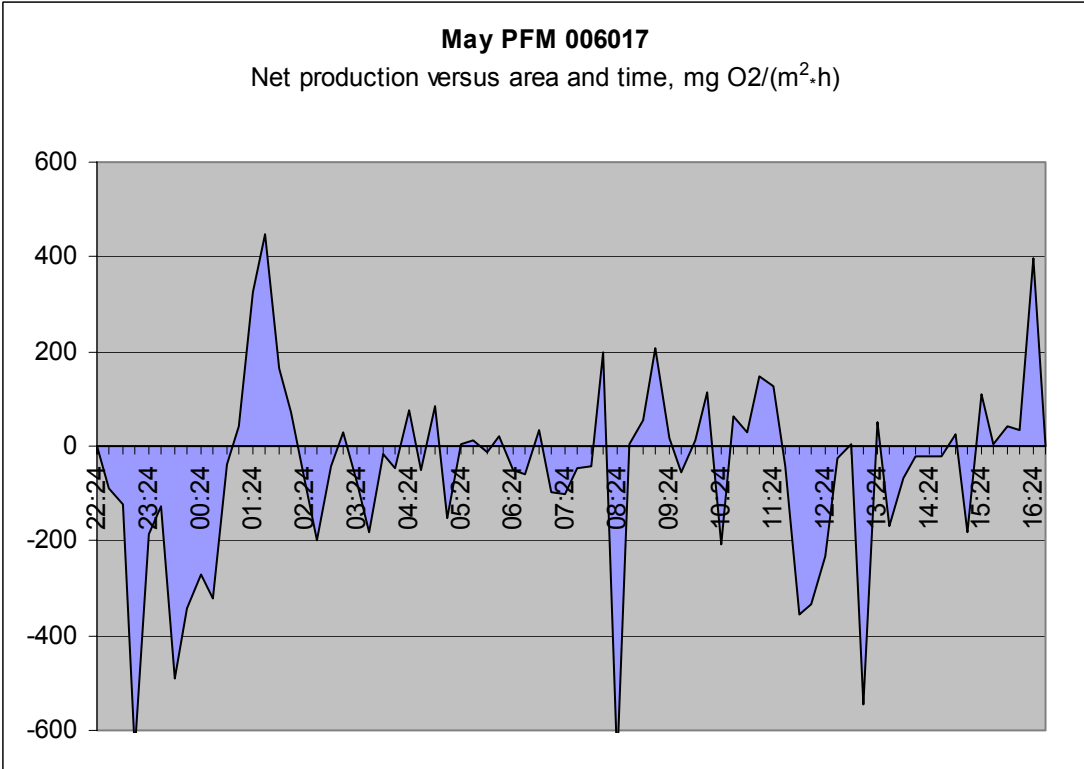
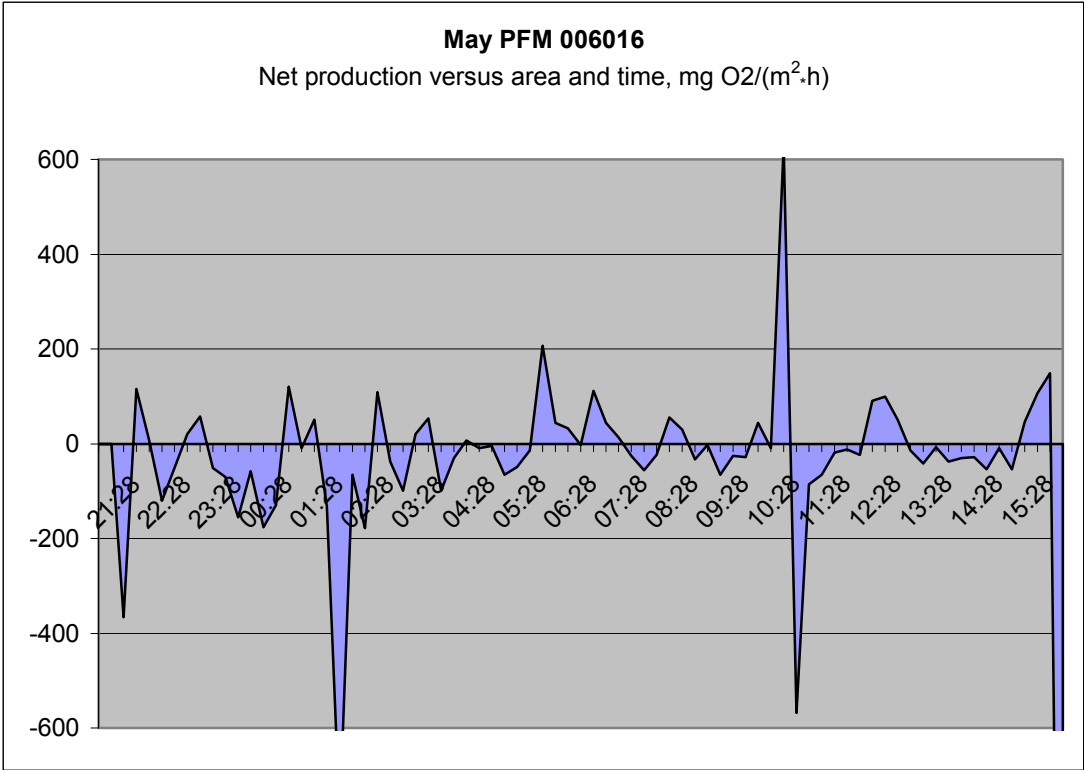
Station	Date	Time	PAR ($\mu\text{mol}/\text{m}^2 \cdot \text{s}$)			Water transparency (m)
			Yta	0.5 m	1.0 m	
PFM 6016	2006-05-05	14:55	355	100	x	x
	2006-07-27	13:50	1,640	540	360	x
	2006-07-28	15:00	415	238	147	x
	2006-08-28	16:20	170	89	43	x
	2006-08-29	19:00	28	22	15	x

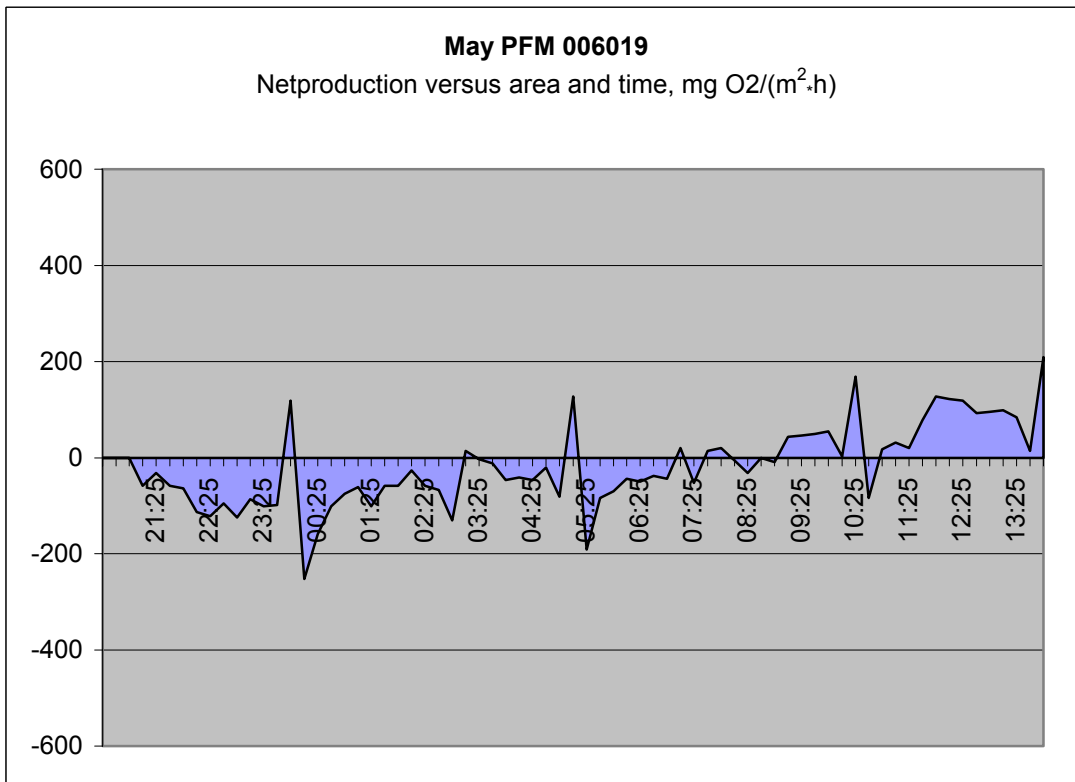
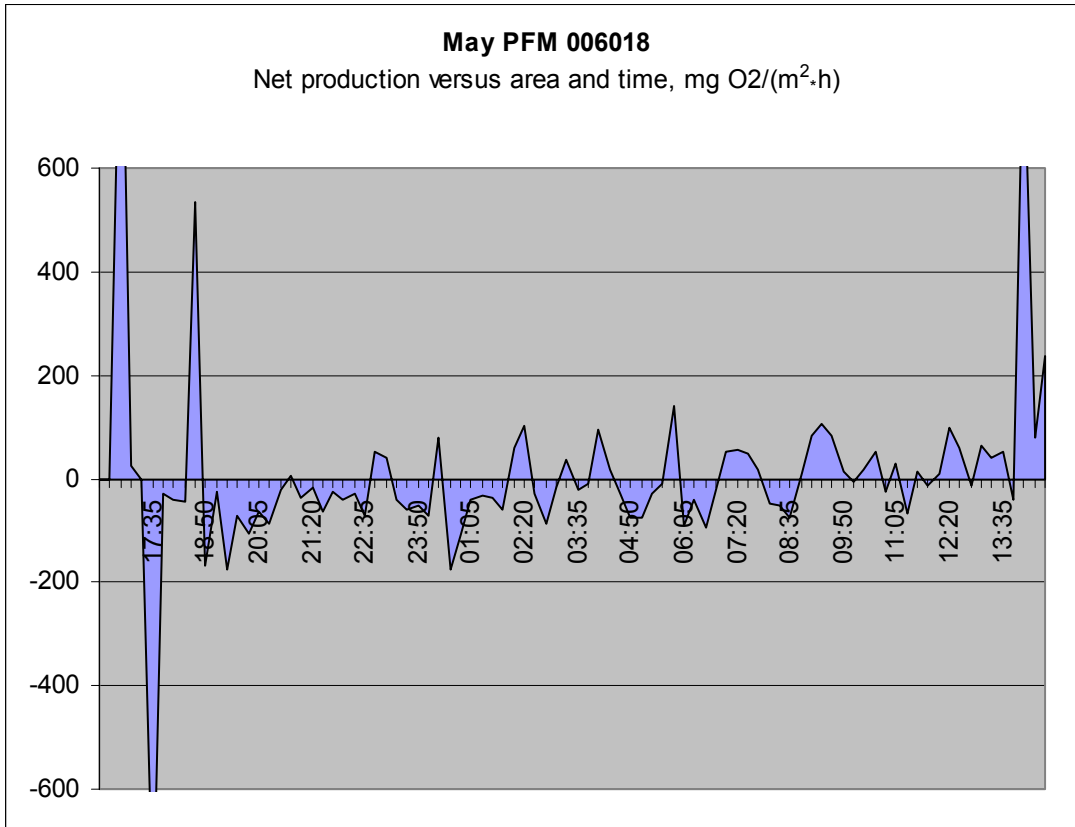
Station	Date	Time	PAR ($\mu\text{mol}/\text{m}^2 \cdot \text{s}$)					Water transparency (m)	
			Yta	0.5 m	1.0 m	1.5 m	1.8 m		2.0 m
PFM 6017	2006-05-05	17:55	175	60	15	5.2			x
	2006-05-06	10:25	330	104	40	25			x
	2006-05-06	15:55	385	175	70	40			x
	2006-07-25	20:38	38	26	17	7.5		5.5	x
	2006-07-26	15:45	1,340	850	380	195		105	1.5
	2006-07-27	14:00	1,520	1,250	690	400		220	x
	2006-08-29	19:30	28	15	8.5	6	3.5		1.6
	2006-08-30	10:00	1,116	820	307	183	145		1.8
	2006-08-30	19:00	60	36	17	5.5	4.1		1.6

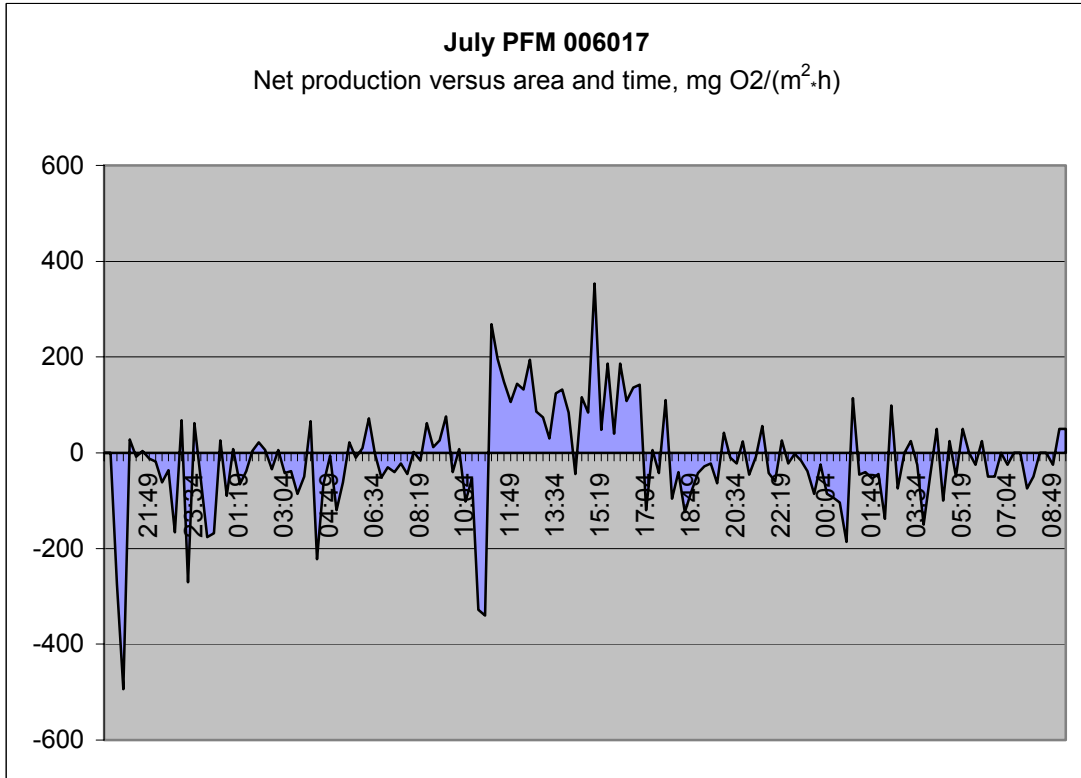
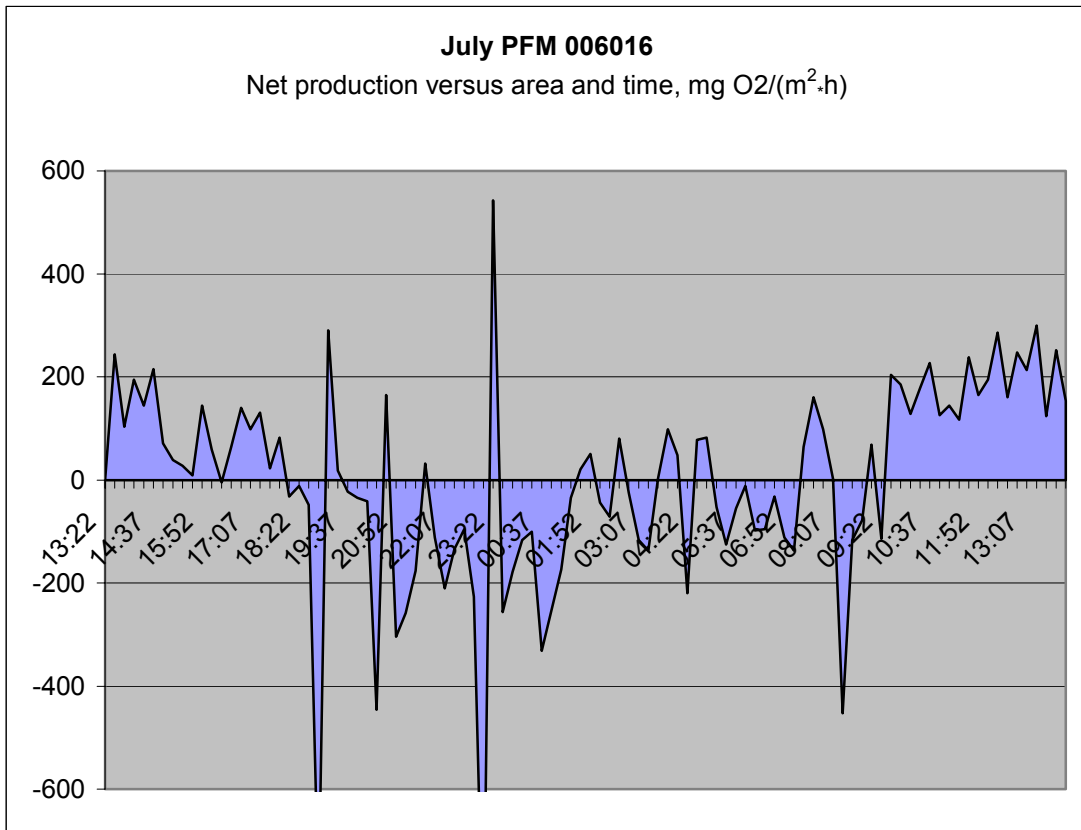
Station	Date	Time	PAR ($\mu\text{mol}/\text{m}^2\cdot\text{s}$)			Water transparency (m)
			Yta	0.5 m	1.0 m	
PFM 6018	2006-05-03	11:18	291.5	107.3	83.49	1.5
	2006-05-03	15:15	116.3	94.3	54.9	1.5

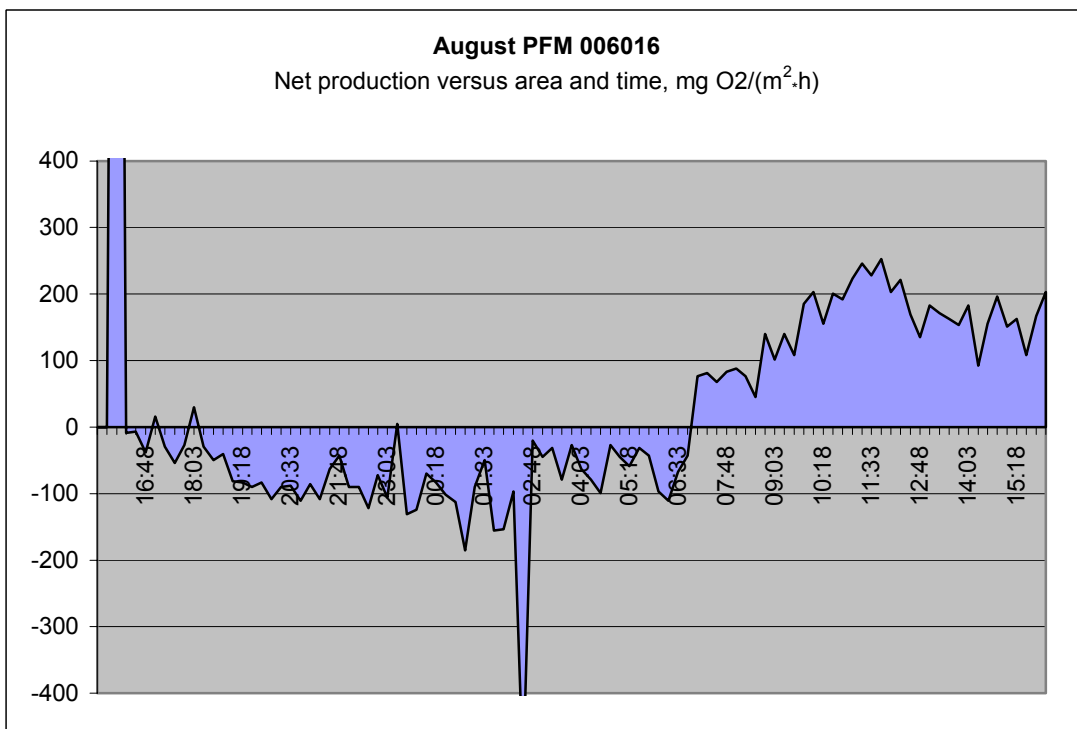
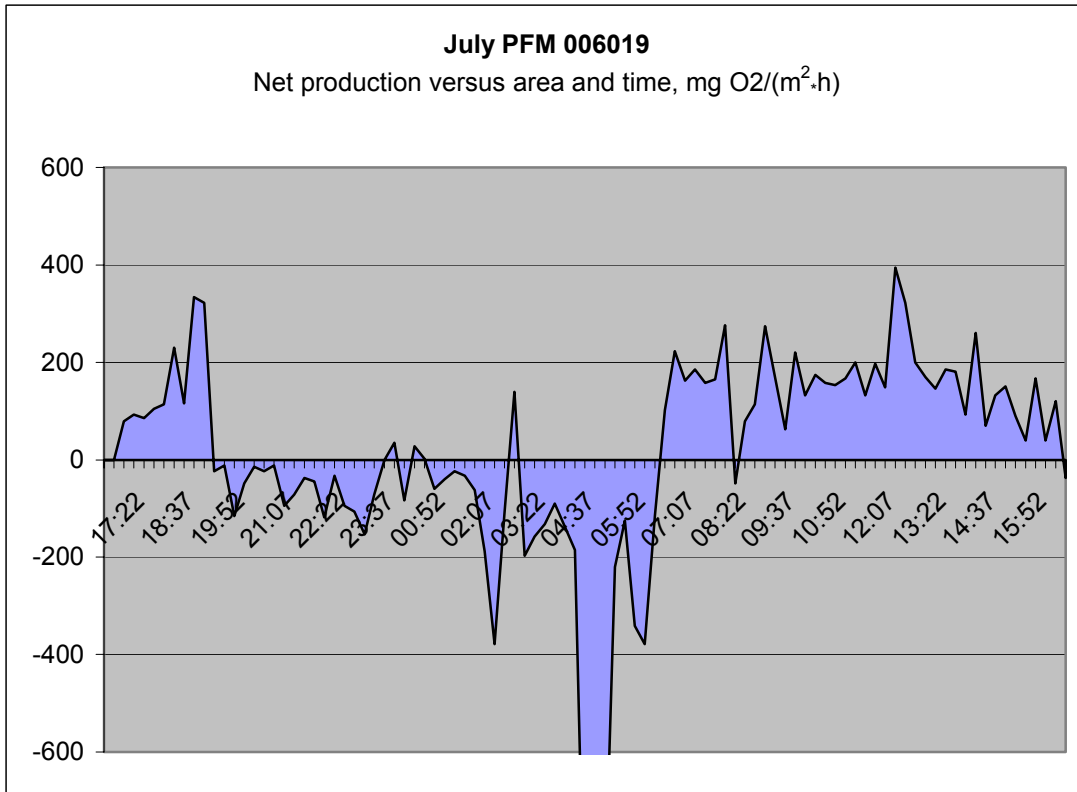
Station	Date	Time	PAR ($\mu\text{mol}/\text{m}^2\cdot\text{s}$)												Water transparency (m)
			Yta	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m	5.5 m	
PFM 6018	2006-05-04	18:52	100.6	70.2	45.6	x	27.2	x	10.2	x	8.3	x	5.3		x
	2006-07-24	17:00	335	292	240	155	94	75	61	58	53	35	34	33	x
	2006-07-25	17:17	690	640	410	357	306	263	172	115	75	88	74	53	x

Net production versus area and time



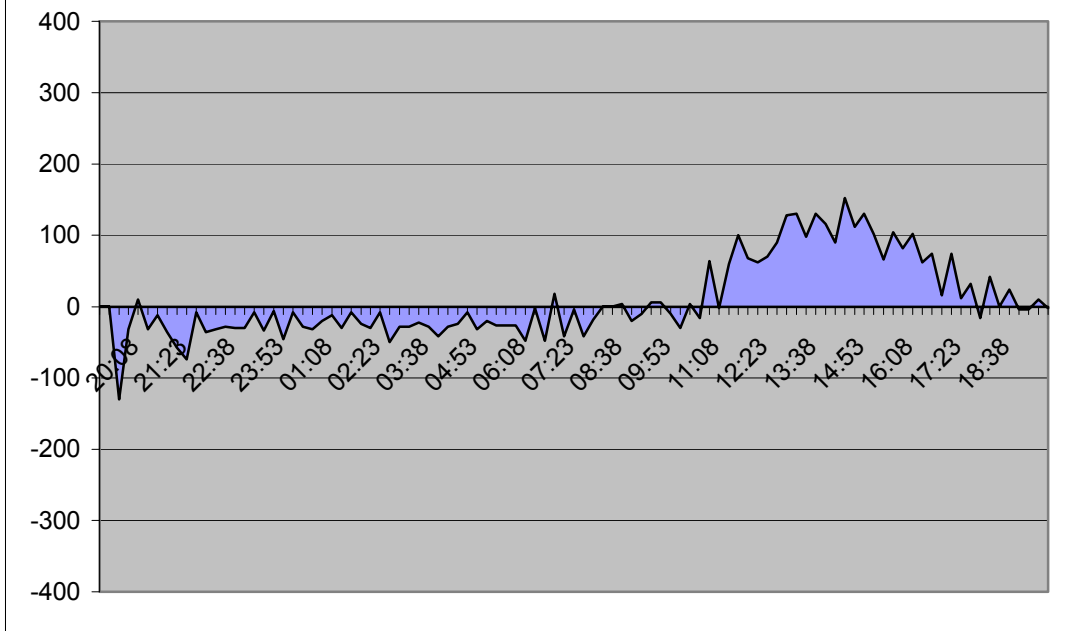






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Net production versus area and time, mg O₂/(m².h)



Calculated net production and respiration values

May PFM 006016

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-04	20:43	12.19	0	0				
2006-05-04	20:58	11.87	0	0	-365.98			-114.37
2006-05-04	21:13	11.97	0	0	116.00			36.25
2006-05-04	21:28	11.98	0	0	6.96			2.18
2006-05-04	21:43	11.87	0	0	-120.64			-37.70
2006-05-04	21:58	11.83	0	0	-51.04			-15.95
2006-05-04	22:13	11.85	0	0	20.88			6.53
2006-05-04	22:28	11.90	0	0	58.00			18.12
2006-05-04	22:43	11.85	0	0	-51.04			-15.95
2006-05-04	22:58	11.79	0	0	-69.60			-21.75
2006-05-04	23:13	11.66	0	0	-155.44			-48.58
2006-05-04	23:28	11.61	0	0	-58.00			-18.12
2006-05-04	23:43	11.46	0	0	-176.32			-55.10
2006-05-04	23:58	11.35	0	0	-129.92			-40.60
2006-05-05	00:13	11.45	0	0	120.64			37.70
2006-05-05	00:28	11.44	0	0	-9.28			-2.90
2006-05-05	00:43	11.49	0	0	51.04			15.95
2006-05-05	00:58	11.37	0	0	-132.24			-41.33
2006-05-05	01:13	10.69	0	0	-788.80			-246.50
2006-05-05	01:28	10.64	0	0	-64.96			-20.30
2006-05-05	01:43	10.48	0	0	-178.64			-55.82
2006-05-05	01:58	10.58	0	0	109.04			34.07
2006-05-05	02:13	10.54	0	0	-37.12			-11.60
2006-05-05	02:28	10.46	0	0	-99.76			-31.18
2006-05-05	02:43	10.48	0	0	20.88			6.53
2006-05-05	02:58	10.52	0	0	53.36			16.68
2006-05-05	03:13	10.44	0.01	6.3	-99.76	-1,237,103.17	-10,630.94	
2006-05-05	03:28	10.41	0.01	12.6	-30.16	-187,003.97	-16,07.00	
2006-05-05	03:43	10.42	2.67	2,402.55	6.96	226.32	1.94	
2006-05-05	03:58	10.41	5.33	4,792.5	-9.28	-151.28	-1.30	
2006-05-05	04:13	10.40	12.36	11,126.25	-4.64	-32.58	-0.28	
2006-05-05	04:28	10.35	19.40	17,460	-64.96	-290.66	-2.50	
2006-05-05	04:43	10.31	28.87	25,983	-48.72	-146.49	-1.26	
2006-05-05	04:58	10.29	38.34	34,506	-13.92	-31.52	-0.27	
2006-05-05	05:13	10.47	54.32	48,887.955	206.48	329.96	2.84	
2006-05-05	05:28	10.51	70.30	63,269.91	44.08	54.43	0.47	
2006-05-05	05:43	10.54	116.80	105,119.955	32.48	24.14	0.21	
2006-05-05	05:58	10.54	163.30	146,970	-2.32	-1.23	-0.01	
2006-05-05	06:13	10.63	196.90	177,210	111.36	49.09	0.42	
2006-05-05	06:28	10.67	230.50	207,450	44.08	16.60	0.14	
2006-05-05	06:43	10.68	262.60	236,340	13.92	4.60	0.04	
2006-05-05	06:58	10.66	294.70	265,230	-25.52	-7.52	-0.06	
2006-05-05	07:13	10.61	278.70	250,830	-55.68	-17.34	-0.15	

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-05	07:28	10.59	262.70	236,430	-23.20	-7.67	-0.07	
2006-05-05	07:43	10.64	339.80	305,820	55.68	14.22	0.12	
2006-05-05	07:58	10.67	416.90	375,210	30.16	6.28	0.05	
2006-05-05	08:13	10.64	445.65	401,085	-32.48	-6.33	-0.05	
2006-05-05	08:28	10.64	474.40	426,960	-2.32	-0.42	-0.00	
2006-05-05	08:43	10.58	500.95	450,855	-64.96	-11.26	-0.10	
2006-05-05	08:58	10.56	527.50	474,750	-25.52	-4.20	-0.04	
2006-05-05	09:13	10.53	551.35	496,214.55	-27.84	-4.38	-0.04	
2006-05-05	09:28	10.57	575.20	517,679.1	44.08	6.65	0.06	
2006-05-05	09:43	10.56	596.40	536,759.55	-9.28	-1.35	-0.01	
2006-05-05	09:58	11.11	617.60	555,840	628.72	88.37	0.76	
2006-05-05	10:13	10.62	632.60	569,340	-568.40	-78.00	-0.67	
2006-05-05	10:28	10.54	647.60	582,840	-85.84	-11.51	-0.10	
2006-05-05	10:43	10.49	662.10	595,890	-64.96	-8.52	-0.07	
2006-05-05	10:58	10.47	676.60	608,940	-18.56	-2.38	-0.02	
2006-05-05	11:13	10.46	683.90	615,509.55	-11.60	-1.47	-0.01	
2006-05-05	11:28	10.44	691.20	622,079.1	-23.20	-2.91	-0.03	
2006-05-05	11:43	10.52	661.80	595,619.1	90.48	11.87	0.10	
2006-05-05	11:58	10.60	632.40	569,159.1	99.76	13.69	0.12	
2006-05-05	12:13	10.65	663.70	597,329.55	51.04	6.68	0.06	
2006-05-05	12:28	10.64	695.00	625,500	-13.92	-1.74	-0.01	
2006-05-05	12:43	10.60	684.10	615,689.55	-41.76	-5.30	-0.05	
2006-05-05	12:58	10.59	673.20	605,879.1	-6.96	-0.90	-0.01	
2006-05-05	13:13	10.56	663.95	597,554.1	-37.12	-4.85	-0.04	
2006-05-05	13:28	10.54	654.70	589,229.1	-30.16	-4.00	-0.03	
2006-05-05	13:43	10.51	637.55	573,794.1	-27.84	-3.79	-0.03	
2006-05-05	13:58	10.47	620.40	558,359.1	-53.36	-7.47	-0.06	
2006-05-05	14:13	10.46	602.50	542,249.55	-9.28	-1.34	-0.01	
2006-05-05	14:28	10.41	584.60	526,140	-53.36	-7.92	-0.07	
2006-05-05	14:43	10.45	562.45	506,205	46.40	7.16	0.06	
2006-05-05	14:58	10.54	540.30	486,270	106.72	17.15	0.15	
2006-05-05	15:13	10.67	513.25	461,925	148.48	25.11	0.22	
2006-05-05	15:28	8.74	486.20	437,580	-2,241.12	-400.13	-3.44	

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-06	22:24	13.42	0.00	0				
2006-05-06	22:39	13.34	0.00	0	-87.00			-27.19
2006-05-06	22:54	13.23	0.00	0	-122.96			-38.43
2006-05-06	23:09	12.68	0.00	0	-640.32			-200.10
2006-05-06	23:24	12.52	0.00	0	-187.92			-58.72
2006-05-06	23:39	12.41	0.00	0	-125.28			-39.15
2006-05-06	23:54	11.99	0.00	0	-489.52			-152.97
2006-05-07	00:09	11.69	0.00	0	-343.36			-107.30
2006-05-07	00:24	11.46	0.00	0	-269.12			-84.10
2006-05-07	00:39	11.18	0.00	0	-322.48			-100.77
2006-05-07	00:54	11.15	0.00	0	-37.12			-11.60
2006-05-07	01:09	11.19	0.00	0	41.76			13.05
2006-05-07	01:24	11.47	0.00	0	327.12			102.23
2006-05-07	01:39	11.86	0.00	0	447.76			139.93
2006-05-07	01:54	12.00	0.00	0	164.72			51.48
2006-05-07	02:09	12.06	0.00	0	71.92			22.47
2006-05-07	02:24	11.99	0.00	0	-76.56			-23.92
2006-05-07	02:39	11.82	0.00	0	-197.20			-61.63
2006-05-07	02:54	11.79	0.00	0	-41.76			-13.05
2006-05-07	03:09	11.81	0.05	47.7	30.16	49,397.27	424.49	
2006-05-07	03:24	11.75	0.11	95.4	-74.24	-60,796.65	-522.45	
2006-05-07	03:39	11.59	3.40	3,057.3	-180.96	-4,624.18	-39.74	
2006-05-07	03:54	11.58	6.69	6,019.2	-18.56	-240.90	-2.07	
2006-05-07	04:09	11.54	3.34	30,09.6	-46.40	-1,204.48	-10.35	
2006-05-07	04:24	11.60	0.00	0	74.24			23.20
2006-05-07	04:39	11.56	0.00	0	-51.04			-15.95
2006-05-07	04:54	11.63	0.00	0	85.84			26.82
2006-05-07	05:09	11.50	37.35	33,615	-153.12	-355.87	-3.06	
2006-05-07	05:24	11.50	74.70	67,230	2.32	2.70	0.02	
2006-05-07	05:39	11.51	121.60	109,440	13.92	9.94	0.09	
2006-05-07	05:54	11.50	168.50	151,650	-13.92	-7.17	-0.06	
2006-05-07	06:09	11.52	201.90	181,710	23.20	9.97	0.09	
2006-05-07	06:24	11.48	235.30	211,770	-48.72	-17.97	-0.15	
2006-05-07	06:39	11.43	267.00	240,300	-58.00	-18.86	-0.16	
2006-05-07	06:54	11.46	298.70	268,830	34.80	10.11	0.09	
2006-05-07	07:09	11.38	281.80	253,620	-97.44	-30.02	-0.26	
2006-05-07	07:24	11.29	264.90	238,410	-102.08	-33.45	-0.29	
2006-05-07	07:39	11.25	340.65	306,585	-46.40	-11.82	-0.10	
2006-05-07	07:54	11.21	416.40	374,760	-41.76	-8.71	-0.07	
2006-05-07	08:09	11.38	444.55	400,095	199.52	38.96	0.33	
2006-05-07	08:24	10.81	472.70	425,430	-665.84	-122.27	-1.05	
2006-05-07	08:39	10.81	495.95	446,354.55	2.32	0.41	0.00	
2006-05-07	08:54	10.86	519.20	467,279.1	55.68	9.31	0.08	
2006-05-07	09:09	11.04	537.90	484,109.55	208.80	33.70	0.29	
2006-05-07	09:24	11.06	556.60	500,940	18.56	2.89	0.02	
2006-05-07	09:39	11.01	575.30	517,770	-53.36	-8.05	-0.07	
2006-05-07	09:54	11.02	594.00	534,600	13.92	2.03	0.02	
2006-05-07	10:09	11.12	607.00	546,300	113.68	16.26	0.14	

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-07	10:24	10.94	620.00	558,000	-206.48	-28.91	-0.25	
2006-05-07	10:39	11.00	632.70	569,429.55	64.96	8.91	0.08	
2006-05-07	10:54	11.02	645.40	580,859.1	27.84	3.74	0.03	
2006-05-07	11:09	11.15	653.65	588,284.1	148.48	19.72	0.17	
2006-05-07	11:24	11.26	661.90	595,709.1	125.28	16.43	0.14	
2006-05-07	11:39	11.22	663.30	596,969.1	-41.76	-5.47	-0.05	
2006-05-07	11:54	10.92	664.70	598,229.1	-354.96	-46.36	-0.40	
2006-05-07	12:09	10.63	665.85	599,264.55	-334.08	-43.55	-0.37	
2006-05-07	12:24	10.43	667.00	600,300	-232.00	-30.19	-0.26	
2006-05-07	12:39	10.41	654.45	589,004.55	-25.52	-3.38	-0.03	
2006-05-07	12:54	10.41	641.90	577,709.1	4.64	0.63	0.01	
2006-05-07	13:09	9.94	625.45	562,904.55	-545.20	-75.67	-0.65	
2006-05-07	13:24	9.98	609.00	548,100	51.04	7.28	0.06	
2006-05-07	13:39	9.84	601.55	541,395	-169.36	-24.44	-0.21	
2006-05-07	13:54	9.78	594.10	534,690	-67.28	-9.83	-0.08	
2006-05-07	14:09	9.76	578.50	520,649.55	-23.20	-3.48	-0.03	
2006-05-07	14:24	9.74	562.90	506,609.1	-20.88	-3.22	-0.03	
2006-05-07	14:39	9.72	536.25	482,624.55	-23.20	-3.76	-0.03	
2006-05-07	14:54	9.74	509.60	458,640	25.52	4.35	0.04	
2006-05-07	15:09	9.59	484.75	436,275	-180.96	-32.41	-0.28	
2006-05-07	15:24	9.68	459.90	413,910	111.36	21.02	0.18	
2006-05-07	15:39	9.69	429.95	386,955	4.64	0.94	0.01	
2006-05-07	15:54	9.73	400.00	360,000	44.08	9.57	0.08	
2006-05-07	16:09	9.76	368.85	331,965	34.80	8.19	0.07	
2006-05-07	16:24	10.10	337.70	303,930	399.04	102.57	0.88	
2006-05-07	16:39		304.25	273,825				

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-02	16:35	12.31	70.80	63,719.91				
2006-05-02	16:50	13.22	63.92	57,527.955	1,053.28	1,430.39	12.29	
2006-05-02	17:05	13.24	57.04	51,336	23.20	35.31	0.30	
2006-05-02	17:20	13.24	44.44	39,991.5	0.00	0.00	0.00	
2006-05-02	17:35	12.50	31.83	28,647	-853.76	-2,328.34	-20.01	
2006-05-02	17:50	12.48	25.39	22,851	-30.16	-103.11	-0.89	
2006-05-02	18:05	12.44	18.95	17,055	-39.44	-180.67	-1.55	
2006-05-02	18:20	12.40	16.41	14,764.5	-44.08	-233.25	-2.00	
2006-05-02	18:35	12.87	13.86	12,474	535.92	3,356.48	28.84	
2006-05-02	18:50	12.72	7.89	7,100.55	-167.04	-1,837.89	-15.79	
2006-05-02	19:05	12.70	1.92	1,727.1	-23.20	-1,049.45	-9.02	
2006-05-02	19:20	12.55	2.05	1,840.95	-174.00	-7,384.10	-63.45	
2006-05-02	19:35	12.49	2.17	1,954.8	-69.60	-2,781.61	-23.90	
2006-05-02	19:50	12.40	1.09	977.4	-106.72	-8,530.28	-73.30	
2006-05-02	20:05	12.34	0	0	-64.96			-20.30
2006-05-02	20:20	12.27	0	0	-85.84			-26.83
2006-05-02	20:35	12.25	0	0	-20.88			-6.52
2006-05-02	20:50	12.26	0	0	4.64			1.45
2006-05-02	21:05	12.23	0	0	-34.80			-10.88
2006-05-02	21:20	12.21	0	0	-18.56			-5.80
2006-05-02	21:35	12.16	0	0	-62.64			-19.58
2006-05-02	21:50	12.13	0	0	-25.52			-7.98
2006-05-02	22:05	12.10	0	0	-39.44			-12.33
2006-05-02	22:20	12.07	0	0	-30.16			-9.42
2006-05-02	22:35	12.01	0	0	-69.60			-21.75
2006-05-02	22:50	12.06	0	0	53.36			16.67
2006-05-02	23:05	12.09	0	0	39.44			12.33
2006-05-02	23:20	12.06	0	0	-39.44			-12.32
2006-05-02	23:35	12.01	0	0	-60.32			-18.85
2006-05-02	23:50	11.96	0	0	-53.36			-16.67
2006-05-03	00:05	11.90	0	0	-69.60			-21.75
2006-05-03	00:20	11.97	0	0	78.88			24.65
2006-05-03	00:35	11.82	0	0	-176.32			-55.10
2006-05-03	00:50	11.72	0	0	-109.04			-34.08
2006-05-03	01:05	11.69	0	0	-41.76			-13.05
2006-05-03	01:20	11.66	0	0	-32.48			-10.15
2006-05-03	01:35	11.63	0	0	-34.80			-10.88
2006-05-03	01:50	11.58	0	0	-60.32			-18.85
2006-05-03	02:05	11.63	0	0	60.32			18.85
2006-05-03	02:20	11.72	0	0	102.08			31.90
2006-05-03	02:35	11.69	0	0	-27.84			-8.70
2006-05-03	02:50	11.62	0	0	-88.16			-27.55
2006-05-03	03:05	11.60	0	0	-18.56			-5.80
2006-05-03	03:20	11.63	0	0	34.80			10.87
2006-05-03	03:35	11.61	0	0	-20.88			-6.53
2006-05-03	03:50	11.61	0.38	345.14955	-9.28	-2,100.54	-18.05	
2006-05-03	04:05	11.69	0.77	690.2991	95.12	10,765.26	92.51	
2006-05-03	04:20	11.70	4.16	3,747.14955	18.56	386.96	3.33	

May PFM 006018 cont'd

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-03	04:35	11.68	7.56	6,804	-30.16	-346.30	-2.98	
2006-05-03	04:50	11.61	12.72	11,448	-74.24	-506.64	-4.35	
2006-05-03	05:05	11.55	17.88	16,092	-76.56	-371.69	-3.19	
2006-05-03	05:20	11.52	29.83	26,847	-27.84	-81.01	-0.70	
2006-05-03	05:35	11.52	41.78	37,602	-9.28	-19.28	-0.17	
2006-05-03	05:50	11.64	60.09	54,080.955	141.52	204.44	1.76	
2006-05-03	06:05	11.56	78.40	70,559.91	-90.48	-100.18	-0.86	
2006-05-03	06:20	11.53	87.95	79,154.955	-39.44	-38.93	-0.33	
2006-05-03	06:35	11.44	97.50	87,750	-95.12	-84.69	-0.73	
2006-05-03	06:50	11.43	117.90	106,110	-20.88	-15.37	-0.13	
2006-05-03	07:05	11.47	138.30	124,470	53.36	33.49	0.29	
2006-05-03	07:20	11.52	190.25	171,225	55.68	25.41	0.22	
2006-05-03	07:35	11.56	242.20	217,980	46.40	16.63	0.14	
2006-05-03	07:50	11.58	327.10	294,390	18.56	4.93	0.04	
2006-05-03	08:05	11.53	412.00	370,800	-48.72	-10.26	-0.09	
2006-05-03	08:20	11.49	398.05	358,245	-51.04	-11.13	-0.10	
2006-05-03	08:35	11.42	384.10	345,690	-76.56	-17.30	-0.15	
2006-05-03	08:50	11.43	301.35	271,215	9.28	2.67	0.02	
2006-05-03	09:05	11.50	218.60	196,740	83.52	33.17	0.29	
2006-05-03	09:20	11.59	215.25	193,725	104.40	42.10	0.36	
2006-05-03	09:35	11.66	211.90	190,710	81.20	33.26	0.29	
2006-05-03	09:50	11.68	375.05	337,544.55	13.92	3.22	0.03	
2006-05-03	10:05	11.67	538.20	484,379.1	-6.96	-1.12	-0.01	
2006-05-03	10:20	11.69	536.50	482,849.55	18.56	3.00	0.03	
2006-05-03	10:35	11.73	534.80	481,320	53.36	8.66	0.07	
2006-05-03	10:50	11.71	453.80	408,420	-23.20	-4.44	-0.04	
2006-05-03	11:05	11.74	372.80	335,520	30.16	7.02	0.06	
2006-05-03	11:20	11.68	433.25	389,925	-67.28	-13.48	-0.12	
2006-05-03	11:35	11.69	493.70	444,330	11.60	2.04	0.02	
2006-05-03	11:50	11.68	516.80	465,119.55	-13.92	-2.34	-0.02	
2006-05-03	12:05	11.69	539.90	485,909.1	9.28	1.49	0.01	
2006-05-03	12:20	11.77	585.60	527,039.55	99.76	14.79	0.13	
2006-05-03	12:35	11.82	631.30	568,170	58.00	7.98	0.07	
2006-05-03	12:50	11.81	626.00	563,399.55	-11.60	-1.61	-0.01	
2006-05-03	13:05	11.87	620.70	558,629.1	62.64	8.76	0.08	
2006-05-03	13:20	11.90	596.65	536,984.55	39.44	5.74	0.05	
2006-05-03	13:35	11.95	572.60	515,340	53.36	8.09	0.07	
2006-05-03	13:50	11.91	485.35	436,815	-39.44	-7.05	-0.06	
2006-05-03	14:05	12.66	398.10	358,290	867.68	189.20	1.63	
2006-05-03	14:20	12.73	316.90	285,210	78.30	21.45	0.18	
2006-05-03	14:35	12.93	235.70	212,130	238.77	87.93	0.76	

May PFM 006019

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C · m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-03	20:40	18.10	0	0				
2006-05-03	20:55	15.62	0	0				
2006-05-03	21:10	15.57	0	0	-58.00			-18.12
2006-05-03	21:25	15.54	0	0	-31.90			-9.97
2006-05-03	21:40	15.49	0	0	-58.00			-18.13
2006-05-03	21:55	15.44	0	0	-63.80			-19.94
2006-05-03	22:10	15.34	0	0	-113.10			-35.34
2006-05-03	22:25	15.23	0	0	-121.80			-38.06
2006-05-03	22:40	15.15	0	0	-95.70			-29.91
2006-05-03	22:55	15.04	0	0	-124.70			-38.97
2006-05-03	23:10	14.97	0	0	-87.00			-27.19
2006-05-03	23:25	14.88	0	0	-101.50			-31.72
2006-05-03	23:40	14.80	0	0	-98.60			-30.81
2006-05-03	23:55	14.90	0	0	118.90			37.16
2006-05-04	00:10	14.68	0	0	-252.30			-78.84
2006-05-04	00:25	14.54	0	0	-159.50			-49.84
2006-05-04	00:40	14.46	0	0	-101.50			-31.72
2006-05-04	00:55	14.39	0	0	-75.40			-23.56
2006-05-04	01:10	14.34	0	0	-60.90			-19.03
2006-05-04	01:25	14.25	0	0	-101.50			-31.72
2006-05-04	01:40	14.20	0	0	-58.00			-18.13
2006-05-04	01:55	14.15	0	0	-58.00			-18.12
2006-05-04	02:10	14.13	0	0	-26.10			-8.16
2006-05-04	02:25	14.08	0	0	-58.00			-18.13
2006-05-04	02:40	14.02	0	0	-66.70			-20.84
2006-05-04	02:55	13.91	0	0	-130.50			-40.78
2006-05-04	03:10	13.92	0.01	6.3	14.50	179,811.51	1,545.19	
2006-05-04	03:25	13.92	0.01	12.6	-2.90	-17,981.15	-154.52	
2006-05-04	03:40	13.91	2.67	2,402.55	-11.60	-377.20	-3.24	
2006-05-04	03:55	13.87	5.33	4,792.5	-46.40	-756.39	-6.50	
2006-05-04	04:10	13.83	12.36	11,126.25	-40.60	-285.08	-2.45	
2006-05-04	04:25	13.79	19.40	17,460	-46.40	-207.62	-1.78	
2006-05-04	04:40	13.78	28.87	25,983	-20.30	-61.04	-0.52	
2006-05-04	04:55	13.71	38.34	34,506	-81.20	-183.84	-1.58	
2006-05-04	05:10	13.82	54.32	48,887.955	127.60	203.91	1.75	
2006-05-04	05:25	13.65	70.30	63,269.91	-191.40	-236.34	-2.03	
2006-05-04	05:40	13.58	116.80	105,119.955	-84.10	-62.50	-0.54	
2006-05-04	05:55	13.52	163.30	146,970	-69.60	-37.00	-0.32	
2006-05-04	06:10	13.48	196.90	177,210	-43.50	-19.18	-0.16	
2006-05-04	06:25	13.44	230.50	207,450	-49.30	-18.57	-0.16	
2006-05-04	06:40	13.41	262.60	236,340	-37.70	-12.46	-0.11	
2006-05-04	06:55	13.37	294.70	265,230	-43.50	-12.81	-0.11	
2006-05-04	07:10	13.39	278.70	250,830	20.30	6.32	0.05	
2006-05-04	07:25	13.34	262.70	236,430	-52.20	-17.25	-0.15	
2006-05-04	07:40	13.35	339.80	305,820	14.50	3.70	0.03	
2006-05-04	07:55	13.37	416.90	375,210	20.30	4.23	0.04	
2006-05-04	08:10	13.37	445.65	401,085	-5.80	-1.13	-0.01	
2006-05-04	08:25	13.34	474.40	426,960	-31.90	-5.84	-0.05	

May PFM 006019 cont'd

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C · m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-05-04	08:40	13.34	500.95	450,855	0.00	0.00	0.00	
2006-05-04	08:55	13.33	527.50	474,750	-8.70	-1.43	-0.01	
2006-05-04	09:10	13.37	551.35	496,214.55	43.50	6.85	0.06	
2006-05-04	09:25	13.41	575.20	517,679.1	46.40	7.00	0.06	
2006-05-04	09:40	13.45	596.40	536,759.55	49.30	7.18	0.06	
2006-05-04	09:55	13.50	617.60	555,840	55.10	7.74	0.07	
2006-05-04	10:10	13.50	632.60	569,340	2.90	0.40	0.00	
2006-05-04	10:25	13.65	647.60	582,840	168.20	22.55	0.19	
2006-05-04	10:40	13.57	662.10	595,890	-84.10	-11.03	-0.09	
2006-05-04	10:55	13.59	676.60	608,940	17.40	2.23	0.02	
2006-05-04	11:10	13.62	683.90	615,509.55	31.90	4.05	0.03	
2006-05-04	11:25	13.63	691.20	622,079.1	20.30	2.55	0.02	
2006-05-04	11:40	13.70	661.80	595,619.1	78.30	10.27	0.09	
2006-05-04	11:55	13.81	632.40	569,159.1	127.60	17.51	0.15	
2006-05-04	12:10	13.92	663.70	597,329.55	121.80	15.93	0.14	
2006-05-04	12:25	14.02	695.00	625,500	118.90	14.85	0.13	
2006-05-04	12:40	14.10	684.10	615,689.55	92.80	11.78	0.10	
2006-05-04	12:55	14.18	673.20	605,879.1	95.70	12.34	0.11	
2006-05-04	13:10	14.27	663.95	597,554.1	98.60	12.89	0.11	
2006-05-04	13:25	14.34	654.70	589,229.1	84.10	11.15	0.10	
2006-05-04	13:40	14.35	637.55	573,794.1	14.50	1.97	0.02	
2006-05-04	13:55	14.53	620.40	558,359.1	208.80	29.22	0.25	

July PFM 006016

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-07-27	13:22	10.18	689.40	620,459.10				
2006-07-27	13:37	10.39	667.00	600,299.55	243.67	31.71	0.72	
2006-07-27	13:52	10.48	644.60	580,140.00	102.96	13.87	0.31	
2006-07-27	14:07	10.65	589.25	530,324.55	194.48	28.65	0.65	
2006-07-27	14:22	10.77	533.90	480,509.10	144.14	23.44	0.53	
2006-07-27	14:37	10.96	553.40	498,059.10	215.07	33.74	0.76	
2006-07-27	14:52	11.02	572.90	515,609.10	70.93	10.75	0.24	
2006-07-27	15:07	11.06	559.50	503,549.55	38.90	6.03	0.14	
2006-07-27	15:22	11.08	546.10	491,490.00	27.46	4.36	0.10	
2006-07-27	15:37	11.09	497.95	448,155.00	9.15	1.60	0.04	
2006-07-27	15:52	11.22	449.80	404,820.00	144.14	27.82	0.63	
2006-07-27	16:07	11.27	420.15	378,135.00	59.49	12.29	0.28	
2006-07-27	16:22	11.26	390.50	351,450.00	-4.58	-1.02	-0.02	
2006-07-27	16:37	11.32	284.65	256,185.00	64.06	19.54	0.44	
2006-07-27	16:52	11.44	178.80	160,920.00	139.57	67.76	1.53	
2006-07-27	17:07	11.53	141.25	127,125.00	98.38	60.46	1.37	
2006-07-27	17:22	11.64	103.70	933,30.00	130.42	109.17	2.47	
2006-07-27	17:37	11.66	118.85	106,965.00	22.88	16.71	0.38	
2006-07-27	17:52	11.73	134.00	120,600.00	82.37	53.36	1.21	
2006-07-27	18:07	11.71	160.00	144,000.00	-32.03	-17.38	-0.39	
2006-07-27	18:22	11.70	186.00	167,400.00	-11.44	-5.34	-0.12	
2006-07-27	18:37	11.65	150.80	135,720.00	-48.05	-27.66	-0.62	
2006-07-27	18:52	10.94	115.60	104,040.00	-821.39	-616.79	-13.93	
2006-07-27	19:07	11.19	89.42	80,478.00	290.58	282.08	6.37	
2006-07-27	19:22	11.21	63.24	56,916.00	18.30	25.12	0.57	
2006-07-27	19:37	11.19	38.95	35,059.50	-22.88	-50.98	-1.15	
2006-07-27	19:52	11.16	14.67	13,203.00	-34.32	-203.08	-4.59	
2006-07-27	20:07	11.12	8.58	7,718.40	-41.18	-416.86	-9.42	
2006-07-27	20:22	10.73	2.48	2,233.80	-446.16	-15,604.02	-352.48	
2006-07-27	20:37	10.87	1.24	1,116.90	164.74	11,522.97	260.30	
2006-07-27	20:52	10.61	0	0.00	-304.30			-95.09
2006-07-27	21:07	10.38	0	0.00	-258.54			-80.79
2006-07-27	21:22	10.23	0	0.00	-176.18			-55.06
2006-07-27	21:37	10.26	0	0.00	32.03			10.01
2006-07-27	21:52	10.16	0	0.00	-112.11			-35.03
2006-07-27	22:07	9.97	0	0.00	-210.50			-65.78
2006-07-27	22:22	9.86	0	0.00	-134.99			-42.19
2006-07-27	22:37	9.77	0	0.00	-96.10			-30.03
2006-07-27	22:52	9.57	0	0.00	-226.51			-70.78
2006-07-27	23:07	8.74	0	0.00	-954.10			-298.16
2006-07-27	23:22	9.21	0	0.00	542.26			169.46
2006-07-27	23:37	8.99	0	0.00	-256.26			-80.08
2006-07-27	23:52	8.83	0	0.00	-178.46			-55.77
2006-07-28	00:07	8.73	0	0.00	-116.69			-36.47
2006-07-28	00:22	8.64	0	0.00	-100.67			-31.46
2006-07-28	00:37	8.35	0	0.00	-331.76			-103.68
2006-07-28	00:52	8.13	0	0.00	-253.97			-79.36
2006-07-28	01:07	7.98	0	0.00	-173.89			-54.34
2006-07-28	01:22	7.95	0	0.00	-34.32			-10.72

July PFM 006016 cont'd

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² -h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw-MJ)	Respiration mg C/(m ² -h)
2006-07-28	01:37	7.97	0	0.00	20.59			6.44
2006-07-28	01:52	8.01	0	0.00	50.34			15.73
2006-07-28	02:07	7.97	0	0.00	-43.47			-13.59
2006-07-28	02:22	7.91	0	0.00	-70.93			-22.16
2006-07-28	02:37	7.98	0	0.00	80.08			25.03
2006-07-28	02:52	7.96	0	0.00	-25.17			-7.87
2006-07-28	03:07	7.86	0.27	247.05	-116.69	-36,900.43	-833.55	
2006-07-28	03:22	7.74	0.55	494.10	-137.28	-21,706.13	-490.33	
2006-07-28	03:37	7.74	5.27	4,747.05	2.29	37.65	0.85	
2006-07-28	03:52	7.83	10.00	9,000.00	98.38	854.03	19.29	
2006-07-28	04:07	7.87	15.69	14,121.00	48.05	265.83	6.00	
2006-07-28	04:22	7.68	21.38	19,242.00	-219.65	-891.80	-20.15	
2006-07-28	04:37	7.74	26.68	24,007.50	77.79	253.15	5.72	
2006-07-28	04:52	7.82	31.97	28,773.00	82.37	223.65	5.05	
2006-07-28	05:07	7.77	38.73	34,852.50	-52.62	-117.96	-2.66	
2006-07-28	05:22	7.66	45.48	40,932.00	-125.84	-240.18	-5.43	
2006-07-28	05:37	7.61	68.44	61,595.95	-54.91	-69.65	-1.57	
2006-07-28	05:52	7.60	91.40	82,259.91	-11.44	-10.86	-0.25	
2006-07-28	06:07	7.52	133.55	120,194.96	-98.38	-63.95	-1.44	
2006-07-28	06:22	7.43	175.70	158,130.00	-96.10	-47.48	-1.07	
2006-07-28	06:37	7.40	173.65	156,285.00	-32.03	-16.01	-0.36	
2006-07-28	06:52	7.31	171.60	154,440.00	-112.11	-56.71	-1.28	
2006-07-28	07:07	7.19	158.65	142,785.00	-137.28	-75.11	-1.70	
2006-07-28	07:22	7.24	145.70	131,130.00	64.06	38.17	0.86	
2006-07-28	07:37	7.38	161.75	145,575.00	160.16	85.95	1.94	
2006-07-28	07:52	7.47	177.80	160,020.00	98.38	48.03	1.09	
2006-07-28	08:07	7.47	195.45	175,905.00	2.29	1.02	0.02	
2006-07-28	08:22	7.07	213.10	191,790.00	-453.02	-184.54	-4.17	
2006-07-28	08:37	6.97	341.25	307,125.00	-116.69	-29.68	-0.67	
2006-07-28	08:52	6.90	469.40	422,460.00	-77.79	-14.39	-0.32	
2006-07-28	09:07	6.96	392.30	353,070.00	68.64	15.19	0.34	
2006-07-28	09:22	6.86	315.20	283,680.00	-114.40	-31.51	-0.71	
2006-07-28	09:37	7.04	315.15	283,635.00	203.63	56.09	1.27	
2006-07-28	09:52	7.20	315.10	283,590.00	185.33	51.06	1.15	
2006-07-28	10:07	7.32	328.15	295,335.00	128.13	33.89	0.77	
2006-07-28	10:22	7.47	341.20	307,080.00	178.46	45.40	1.03	
2006-07-28	10:37	7.67	451.30	406,169.55	226.51	43.57	0.98	
2006-07-28	10:52	7.78	561.40	505,259.10	125.84	19.46	0.44	
2006-07-28	11:07	7.91	511.10	459,989.55	144.14	24.48	0.55	
2006-07-28	11:22	8.01	460.80	414,720.00	116.69	21.98	0.50	
2006-07-28	11:37	8.22	538.10	484,289.55	237.95	38.39	0.87	
2006-07-28	11:52	8.36	615.40	553,859.10	164.74	23.24	0.52	
2006-07-28	12:07	8.53	587.65	528,884.10	194.48	28.73	0.65	
2006-07-28	12:22	8.78	559.90	503,909.10	286.00	44.34	1.00	
2006-07-28	12:37	8.92	463.25	416,924.55	160.16	30.01	0.68	
2006-07-28	12:52	9.14	366.60	329,940.00	247.10	58.51	1.32	
2006-07-28	13:07	9.32	436.10	392,490.00	212.78	42.35	0.96	
2006-07-28	13:22	9.58	505.60	455,040.00	299.73	51.46	1.16	
2006-07-28	13:37	9.69	453.95	408,555.00	123.55	23.63	0.53	
2006-07-28	13:52	9.91	402.30	362,070.00	251.68	54.31	1.23	
2006-07-28	14:07	10.05	365.95	329,355.00	153.30	36.36	0.82	

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-07-25	20:19	10.55	7.67	6,903.00				
2006-07-25	20:34	10.28	3.86	3,469.50	-274.00	-6,169.84	-10.64	
2006-07-25	20:49	9.78	0.04	36.00	-494.00	-107,2048.61	-1,848.91	
2006-07-25	21:04	9.81	0.02	18.00	28.00	121,527.78	209.59	
2006-07-25	21:19	9.80	0	0.00	-8.00			-2.50
2006-07-25	21:34	9.81	0	0.00	4.00			1.25
2006-07-25	21:49	9.79	0	0.00	-12.00			-3.75
2006-07-25	22:04	9.78	0	0.00	-18.00			-5.63
2006-07-25	22:19	9.71	0	0.00	-62.00			-19.37
2006-07-25	22:34	9.68	0	0.00	-36.00			-11.25
2006-07-25	22:49	9.51	0	0.00	-166.00			-51.88
2006-07-25	23:04	9.58	0	0.00	68.00			21.25
2006-07-25	23:19	9.31	0	0.00	-270.00			-84.38
2006-07-25	23:34	9.37	0	0.00	62.00			19.38
2006-07-25	23:49	9.32	0	0.00	-56.00			-17.50
2006-07-26	00:04	9.14	0	0.00	-176.00			-55.00
2006-07-26	00:19	8.97	0	0.00	-168.00			-52.50
2006-07-26	00:34	9.00	0	0.00	26.00			8.13
2006-07-26	00:49	8.91	0	0.00	-90.00			-28.12
2006-07-26	01:04	8.92	0	0.00	8.00			2.50
2006-07-26	01:19	8.85	0	0.00	-66.00			-20.63
2006-07-26	01:34	8.81	0	0.00	-38.00			-11.88
2006-07-26	01:49	8.82	0	0.00	4.00			1.25
2006-07-26	02:04	8.84	0	0.00	22.00			6.88
2006-07-26	02:19	8.84	0	0.00	6.00			1.88
2006-07-26	02:34	8.81	0	0.00	-34.00			-10.62
2006-07-26	02:49	8.82	0	0.00	6.00			1.87
2006-07-26	03:04	8.77	0.77	693.90	-42.00	-4,728.71	-8.16	
2006-07-26	03:19	8.74	1.54	1,387.80	-38.00	-2,139.18	-3.69	
2006-07-26	03:34	8.65	8.17	7,353.90	-86.00	-913.63	-1.58	
2006-07-26	03:49	8.60	14.80	13,320.00	-50.00	-293.26	-0.51	
2006-07-26	04:04	8.67	24.68	22,207.50	66.00	232.19	0.40	
2006-07-26	04:19	8.44	34.55	31,095.00	-222.00	-557.77	-0.96	
2006-07-26	04:34	8.38	41.73	37,557.00	-66.00	-137.29	-0.24	
2006-07-26	04:49	8.37	48.91	44,019.00	-6.00	-10.65	-0.02	
2006-07-26	05:04	8.25	82.50	74,254.50	-120.00	-126.25	-0.22	
2006-07-26	05:19	8.19	116.10	104,490.00	-62.00	-46.36	-0.08	
2006-07-26	05:34	8.21	132.00	118,800.00	22.00	14.47	0.02	
2006-07-26	05:49	8.20	147.90	133,110.00	-10.00	-5.87	-0.01	
2006-07-26	06:04	8.21	140.00	126,000.00	10.00	6.20	0.01	
2006-07-26	06:19	8.28	132.10	118,890.00	72.00	47.31	0.08	
2006-07-26	06:34	8.28	237.85	214,065.00	-2.00	-0.73	-0.00	
2006-07-26	06:49	8.23	343.60	309,240.00	-52.00	-13.14	-0.02	
2006-07-26	07:04	8.20	364.70	328,230.00	-30.00	-7.14	-0.01	
2006-07-26	07:19	8.16	385.80	347,220.00	-40.00	-9.00	-0.02	
2006-07-26	07:34	8.14	336.25	302,625.00	-22.00	-5.68	-0.01	
2006-07-26	07:49	8.09	286.70	258,030.00	-44.00	-13.32	-0.02	
2006-07-26	08:04	8.10	291.95	262,755.00	2.00	0.59	0.00	
2006-07-26	08:19	8.08	297.20	267,480.00	-16.00	-4.67	-0.01	

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ⁻²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-07-26	08:34	8.14	315.55	283,995.00	62.00	17.06	0.03	
2006-07-26	08:49	8.15	333.90	300,510.00	12.00	3.12	0.01	
2006-07-26	09:04	8.18	348.05	313,245.00	26.00	6.48	0.01	
2006-07-26	09:19	8.26	362.20	325,980.00	76.00	18.21	0.03	
2006-07-26	09:34	8.22	470.15	423,135.00	-40.00	-7.39	-0.01	
2006-07-26	09:49	8.22	578.10	520,290.00	8.00	1.20	0.00	
2006-07-26	10:04	8.12	627.85	565,065.00	-102.00	-14.10	-0.02	
2006-07-26	10:19	8.07	677.60	609,840.00	-54.00	-6.92	-0.01	
2006-07-26	10:34	7.74	698.30	628,470.00	-328.00	-40.77	-0.07	
2006-07-26	10:49	7.40	719.00	647,100.00	-340.00	-41.05	-0.07	
2006-07-26	11:04	7.67	706.70	636,029.55	268.00	32.92	0.06	
2006-07-26	11:19	7.86	694.40	624,959.10	196.00	24.50	0.04	
2006-07-26	11:34	8.01	713.20	641,879.55	148.00	18.01	0.03	
2006-07-26	11:49	8.12	732.00	658,800.00	106.00	12.57	0.02	
2006-07-26	12:04	8.26	737.00	663,300.00	144.00	16.96	0.03	
2006-07-26	12:19	8.39	742.00	667,800.00	132.00	15.44	0.03	
2006-07-26	12:34	8.59	737.50	663,750.00	194.00	22.83	0.04	
2006-07-26	12:49	8.67	733.00	659,700.00	86.00	10.18	0.02	
2006-07-26	13:04	8.75	724.50	652,050.00	74.00	8.87	0.02	
2006-07-26	13:19	8.78	716.00	644,400.00	30.00	3.64	0.01	
2006-07-26	13:34	8.90	695.45	625,904.55	124.00	15.48	0.03	
2006-07-26	13:49	9.03	674.90	607,409.10	132.00	16.98	0.03	
2006-07-26	14:04	9.12	649.15	584,234.10	84.00	11.23	0.02	
2006-07-26	14:19	9.07	623.40	561,059.10	-44.00	-6.13	-0.01	
2006-07-26	14:34	9.19	614.80	553,319.10	116.00	16.38	0.03	
2006-07-26	14:49	9.27	606.20	545,579.10	84.00	12.03	0.02	
2006-07-26	15:04	9.63	581.15	523,034.55	354.00	52.88	0.09	
2006-07-26	15:19	9.68	556.10	500,490.00	48.00	7.49	0.01	
2006-07-26	15:34	9.86	526.15	473,535.00	186.00	30.69	0.05	
2006-07-26	15:49	9.90	496.20	446,580.00	40.00	7.00	0.01	
2006-07-26	16:04	10.09	465.45	418,905.00	186.00	34.69	0.06	
2006-07-26	16:19	10.20	434.70	391,230.00	108.00	21.57	0.04	
2006-07-26	16:34	10.33	406.00	365,400.00	136.00	29.08	0.05	
2006-07-26	16:49	10.47	377.30	339,570.00	142.00	32.67	0.06	
2006-07-26	17:04	10.35	337.25	303,525.00	-120.00	-30.89	-0.05	
2006-07-26	17:19	10.36	297.20	267,480.00	6.00	1.75	0.00	
2006-07-26	17:34	10.32	270.70	243,630.00	-42.00	-13.47	-0.02	
2006-07-26	17:49	10.43	244.20	219,780.00	110.00	39.10	0.07	
2006-07-26	18:04	10.33	216.35	194,715.00	-96.00	-38.52	-0.07	
2006-07-26	18:19	10.29	188.50	169,650.00	-40.00	-18.42	-0.03	
2006-07-26	18:34	10.17	126.08	113,467.50	-124.00	-85.38	-0.15	
2006-07-26	18:49	10.09	63.65	57,285.00	-80.00	-109.10	-0.19	
2006-07-26	19:04	10.05	48.35	43,515.00	-42.00	-75.41	-0.13	
2006-07-26	19:19	10.02	33.05	29,745.00	-28.00	-73.54	-0.13	
2006-07-26	19:34	10.00	22.83	20,547.00	-22.00	-83.65	-0.14	
2006-07-26	19:49	9.93	12.61	11,349.00	-64.00	-440.57	-0.76	
2006-07-26	20:04	9.97	9.01	8,108.10	42.00	404.69	0.70	
2006-07-26	20:19	9.96	5.41	4,867.20	-10.00	-160.51	-0.28	
2006-07-26	20:34	9.94	2.70	2,433.60	-22.00	-706.26	-1.22	
2006-07-26	20:49	9.97	0	0.00	24.00			7.50

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² -h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² -h)
2006-07-26	21:04	9.92	0	0.00	-46.00			-14.37
2006-07-26	21:19	9.91	0	0.00	-8.00			-2.50
2006-07-26	21:34	9.97	0	0.00	56.00			17.50
2006-07-26	21:49	9.93	0	0.00	-42.00			-13.12
2006-07-26	22:04	9.87	0	0.00	-60.00			-18.75
2006-07-26	22:19	9.89	0	0.00	26.00			8.12
2006-07-26	22:34	9.87	0	0.00	-22.00			-6.88
2006-07-26	22:49	9.87	0	0.00	-2.00			-0.63
2006-07-26	23:04	9.85	0	0.00	-16.00			-5.00
2006-07-26	23:19	9.81	0	0.00	-38.00			-11.88
2006-07-26	23:34	9.73	0	0.00	-86.00			-26.88
2006-07-26	23:49	9.70	0	0.00	-24.00			-7.50
2006-07-27	00:04	9.62	0	0.00	-86.00			-26.87
2006-07-27	00:19	9.52	0	0.00	-94.00			-29.37
2006-07-27	00:34	9.42	0	0.00	-104.00			-32.50
2006-07-27	00:49	9.23	0	0.00	-186.00			-58.13
2006-07-27	01:04	9.35	0	0.00	114.00			35.63
2006-07-27	01:19	9.30	0	0.00	-46.00			-14.38
2006-07-27	01:34	9.26	0	0.00	-40.00			-12.50
2006-07-27	01:49	9.21	0	0.00	-54.00			-16.88
2006-07-27	02:04	9.16	0	0.00	-44.00			-13.75
2006-07-27	02:19	9.03	0	0.00	-138.00			-43.13
2006-07-27	02:34	9.13	0	0.00	99.00			30.94
2006-07-27	02:49	9.05	0	0.00	-75.00			-23.44
2006-07-27	03:04	9.05	0.08	67.50	0.00	0.00	0.00	
2006-07-27	03:19	9.08	0.15	135.00	25.00	14,467.59	6,930.98	
2006-07-27	03:34	9.05	2.81	2,527.20	-25.00	-772.84	-370.24	
2006-07-27	03:49	8.90	5.47	4,919.40	-150.00	-2,382.15	-1,141.22	
2006-07-27	04:04	8.85	13.61	12,247.20	-50.00	-318.95	-152.80	
2006-07-27	04:19	8.90	21.75	19,575.00	50.00	199.55	95.60	
2006-07-27	04:34	8.80	36.98	33,282.00	-100.00	-234.74	-112.46	
2006-07-27	04:49	8.83	52.21	46,989.00	25.00	41.57	19.91	
2006-07-27	05:04	8.78	92.66	83,389.50	-50.00	-46.84	-22.44	
2006-07-27	05:19	8.83	133.10	119,790.00	50.00	32.61	15.62	
2006-07-27	05:34	8.83	178.30	160,470.00	0.00	0.00	0.00	
2006-07-27	05:49	8.80	223.50	201,150.00	-25.00	-9.71	-4.65	
2006-07-27	06:04	8.83	246.20	221,580.00	25.00	8.81	4.22	
2006-07-27	06:19	8.78	268.90	242,010.00	-50.00	-16.14	-7.73	
2006-07-27	06:34	8.73	242.05	217,845.00	-50.00	-17.93	-8.59	
2006-07-27	06:49	8.73	215.20	193,680.00	-0.00	-0.00	-0.00	
2006-07-27	07:04	8.70	195.55	175,995.00	-25.00	-11.10	-5.32	
2006-07-27	07:19	8.70	175.90	158,310.00	0.00	0.00	0.00	
2006-07-27	07:34	8.70	241.40	217,260.00	0.00	0.00	0.00	
2006-07-27	07:49	8.63	306.90	276,210.00	-75.00	-21.21	-10.16	
2006-07-27	08:04	8.58	313.15	281,835.00	-50.00	-13.86	-6.64	
2006-07-27	08:19	8.58	319.40	287,460.00	0.00	0.00	0.00	
2006-07-27	08:34	8.58	292.45	263,205.00	0.00	0.00	0.00	
2006-07-27	08:49	8.55	265.50	238,950.00	-25.00	-8.17	-3.92	
2006-07-27	09:04	8.60	383.30	344,970.00	50.00	11.32	5.42	
2006-07-27	09:19	8.65	501.10	450,990.00	50.00	8.66	4.15	

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Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-07-24	16:22	10.97	254.30	228,870.00				
2006-07-24	16:37	11.04	199.90	179,910.00	78.88	34.25	0.38	
2006-07-24	16:52	11.12	267.85	241,065.00	92.80	30.07	0.33	
2006-07-24	17:07	11.20	335.80	302,220.00	85.84	22.19	0.24	
2006-07-24	17:22	11.29	336.40	302,760.00	104.40	26.94	0.30	
2006-07-24	17:37	11.38	337.00	303,300.00	113.68	29.28	0.32	
2006-07-24	17:52	11.58	295.60	266,040.00	229.68	67.45	0.74	
2006-07-24	18:07	11.68	254.20	228,780.00	116.00	39.61	0.44	
2006-07-24	18:22	11.97	222.40	200,160.00	334.08	130.40	1.44	
2006-07-24	18:37	12.25	190.60	171,540.00	322.48	146.87	1.62	
2006-07-24	18:52	12.23	129.30	116,365.50	-23.20	-15.58	-0.17	
2006-07-24	19:07	12.22	67.99	61,191.00	-11.60	-14.81	-0.16	
2006-07-24	19:22	12.12	48.47	43,618.50	-116.00	-207.77	-2.29	
2006-07-24	19:37	12.08	28.94	26,046.00	-48.72	-146.14	-1.61	
2006-07-24	19:52	12.06	23.05	20,740.50	-13.92	-52.43	-0.58	
2006-07-24	20:07	12.04	17.15	15,435.00	-23.20	-117.43	-1.30	
2006-07-24	20:22	12.03	12.16	10,948.50	-11.60	-82.77	-0.91	
2006-07-24	20:37	11.95	7.18	6,461.99	-95.12	-1,149.99	-12.69	
2006-07-24	20:52	11.89	3.76	3,386.25	-71.92	-1,659.29	-18.31	
2006-07-24	21:07	11.86	0.35	310.50	-37.12	-9,339.77	-103.06	
2006-07-24	21:22	11.82	0.17	155.25	-44.08	-22,181.96	-244.78	
2006-07-24	21:37	11.72	0	0.00	-118.32			-36.97
2006-07-24	21:52	11.69	0	0.00	-32.48			-10.15
2006-07-24	22:07	11.61	0	0.00	-95.12			-29.72
2006-07-24	22:22	11.52	0	0.00	-106.72			-33.35
2006-07-24	22:37	11.38	0	0.00	-153.12			-47.85
2006-07-24	22:52	11.32	0	0.00	-71.92			-22.47
2006-07-24	23:07	11.32	0	0.00	0.00			0.00
2006-07-24	23:22	11.35	0	0.00	34.80			10.88
2006-07-24	23:37	11.28	0	0.00	-83.52			-26.10
2006-07-24	23:52	11.30	0	0.00	27.84			8.70
2006-07-25	00:07	11.31	0	0.00	2.32			0.73
2006-07-25	00:22	11.25	0	0.00	-60.32			-18.85
2006-07-25	00:37	11.22	0	0.00	-39.44			-12.33
2006-07-25	00:52	11.20	0	0.00	-23.20			-7.25
2006-07-25	01:07	11.17	0	0.00	-32.48			-10.15
2006-07-25	01:22	11.12	0	0.00	-62.64			-19.58
2006-07-25	01:37	10.96	0	0.00	-187.92			-58.73
2006-07-25	01:52	10.63	0	0.00	-378.16			-118.18
2006-07-25	02:07	10.54	0	0.00	-109.04			-34.08
2006-07-25	02:22	10.66	0	0.00	139.20			43.50
2006-07-25	02:37	10.49	0	0.00	-197.20			-61.63
2006-07-25	02:52	10.35	0	0.00	-157.76			-49.30
2006-07-25	03:07	10.24	0	0.00	-132.24			-41.32
2006-07-25	03:22	10.16	1.00	896.85	-90.48	-7,881.75	-86.97	
2006-07-25	03:37	10.04	1.99	1,793.70	-136.88	-5,961.84	-65.79	
2006-07-25	03:52	9.88	7.62	6,854.85	-185.60	-2,115.29	-23.34	
2006-07-25	04:07	9.00	13.24	11,916.00	-1,023.12	-6,707.89	-74.02	

July PFM 006019 cont'd

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-07-25	04:22	7.83	20.34	18,310.50	-1,359.52	-5,800.63	-64.01	
2006-07-25	04:37	7.05	27.45	24,705.00	-900.16	-2,846.59	-31.41	
2006-07-25	04:52	6.86	39.74	35,770.50	-220.40	-481.37	-5.31	
2006-07-25	05:07	6.75	52.04	46,836.00	-125.28	-208.97	-2.31	
2006-07-25	05:22	6.46	79.62	71,658.00	-341.04	-371.82	-4.10	
2006-07-25	05:37	6.13	107.20	96,480.00	-378.16	-306.22	-3.38	
2006-07-25	05:52	6.03	150.40	135,360.00	-113.68	-65.61	-0.72	
2006-07-25	06:07	6.12	193.60	174,240.00	102.08	45.77	0.51	
2006-07-25	06:22	6.31	229.50	206,550.00	222.72	84.24	0.93	
2006-07-25	06:37	6.45	265.40	238,860.00	162.40	53.12	0.59	
2006-07-25	06:52	6.61	298.10	268,290.00	185.60	54.05	0.60	
2006-07-25	07:07	6.75	330.80	297,720.00	157.76	41.40	0.46	
2006-07-25	07:22	6.89	346.50	311,850.00	164.72	41.27	0.46	
2006-07-25	07:37	7.13	362.20	325,980.00	276.08	66.17	0.73	
2006-07-25	07:52	7.09	300.25	270,225.00	-48.72	-14.09	-0.16	
2006-07-25	08:07	7.16	238.30	214,470.00	78.88	28.73	0.32	
2006-07-25	08:22	7.25	309.05	278,145.00	113.68	31.93	0.35	
2006-07-25	08:37	7.49	379.80	341,820.00	273.76	62.57	0.69	
2006-07-25	08:52	7.64	474.55	427,095.00	169.36	30.98	0.34	
2006-07-25	09:07	7.69	569.30	512,370.00	62.64	9.55	0.11	
2006-07-25	09:22	7.88	594.45	535,005.00	220.40	32.18	0.36	
2006-07-25	09:37	7.99	619.60	557,640.00	132.24	18.53	0.20	
2006-07-25	09:52	8.14	641.85	577,665.00	174.00	23.53	0.26	
2006-07-25	10:07	8.28	664.10	597,690.00	157.76	20.62	0.23	
2006-07-25	10:22	8.41	681.45	613,305.00	153.12	19.50	0.22	
2006-07-25	10:37	8.56	698.80	628,920.00	167.04	20.75	0.23	
2006-07-25	10:52	8.73	711.90	640,710.00	199.52	24.33	0.27	
2006-07-25	11:07	8.84	725.00	652,500.00	132.24	15.83	0.17	
2006-07-25	11:22	9.01	734.00	660,600.00	197.20	23.32	0.26	
2006-07-25	11:37	9.14	743.00	668,700.00	148.48	17.35	0.19	
2006-07-25	11:52	9.48	747.00	672,300.00	394.40	45.83	0.51	
2006-07-25	12:07	9.76	751.00	675,900.00	322.48	37.27	0.41	
2006-07-25	12:22	9.93	751.00	675,900.00	199.52	23.06	0.25	
2006-07-25	12:37	10.08	751.00	675,900.00	169.36	19.58	0.22	
2006-07-25	12:52	10.20	741.50	667,350.00	146.16	17.11	0.19	
2006-07-25	13:07	10.36	732.00	658,800.00	185.60	22.01	0.24	
2006-07-25	13:22	10.52	728.00	655,200.00	180.96	21.58	0.24	
2006-07-25	13:37	10.60	724.00	651,600.00	92.80	11.13	0.12	
2006-07-25	13:52	10.82	722.50	650,250.00	259.84	31.22	0.34	
2006-07-25	14:07	10.88	721.00	648,900.00	69.60	8.38	0.09	
2006-07-25	14:22	11.00	688.40	619,560.00	132.24	16.68	0.18	
2006-07-25	14:37	11.13	655.80	590,220.00	150.80	19.96	0.22	
2006-07-25	14:52	11.20	630.20	567,180.00	90.48	12.46	0.14	
2006-07-25	15:07	11.24	604.60	544,140.00	39.44	5.66	0.06	
2006-07-25	15:22	11.38	579.45	521,505.00	167.04	25.02	0.28	
2006-07-25	15:37	11.42	554.30	498,870.00	39.44	6.18	0.07	
2006-07-25	15:52	11.52	516.10	464,490.00	120.64	20.29	0.22	
2006-07-25	16:07	11.49	477.90	430,110.00	-37.12	-6.74	-0.07	

August PFM 006016

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-08-28	15:48	7.20	175.10	157,590.00				
2006-08-28	16:03	9.31	115.50	103,950.00	2,382.34	1,790.48	58.25	
2006-08-28	16:18	9.30	183.60	165,240.00	-9.02	-4.27	-0.14	
2006-08-28	16:33	9.30	251.70	226,530.00	-6.77	-2.33	-0.08	
2006-08-28	16:48	9.26	209.80	188,820.00	-38.35	-15.87	-0.52	
2006-08-28	17:03	9.28	167.90	151,110.00	15.79	8.16	0.27	
2006-08-28	17:18	9.25	116.18	104,562.00	-29.33	-21.91	-0.71	
2006-08-28	17:33	9.20	64.46	58,014.00	-54.14	-72.91	-2.37	
2006-08-28	17:48	9.18	51.44	46,291.50	-27.07	-45.69	-1.49	
2006-08-28	18:03	9.21	38.41	34,569.00	29.33	66.28	2.16	
2006-08-28	18:18	9.18	25.68	23,107.50	-29.33	-99.16	-3.23	
2006-08-28	18:33	9.14	12.94	11,646.00	-49.63	-332.95	-10.83	
2006-08-28	18:48	9.10	7.58	6,820.65	-40.61	-465.13	-15.13	
2006-08-28	19:03	9.03	2.22	1,995.30	-81.22	-3,179.97	-103.45	
2006-08-28	19:18	8.95	1.11	997.65	-83.47	-6,536.61	-212.66	
2006-08-28	19:33	8.87	0	0.00	-90.24			-28.2
2006-08-28	19:48	8.80	0	0.00	-83.47			-26.085
2006-08-28	20:03	8.70	0	0.00	-108.29			-33.84
2006-08-28	20:18	8.62	0	0.00	-90.24			-28.2
2006-08-28	20:33	8.55	0	0.00	-87.98			-27.495
2006-08-28	20:48	8.45	0	0.00	-110.54			-34.545
2006-08-28	21:03	8.37	0	0.00	-85.73			-26.79
2006-08-28	21:18	8.28	0	0.00	-108.29			-33.84
2006-08-28	21:33	8.22	0	0.00	-63.17			-19.74
2006-08-28	21:48	8.18	0	0.00	-42.86			-13.395
2006-08-28	22:03	8.10	0	0.00	-90.24			-28.2
2006-08-28	22:18	8.02	0	0.00	-90.24			-28.2
2006-08-28	22:33	7.91	0	0.00	-121.82			-38.07
2006-08-28	22:48	7.85	0	0.00	-72.19			-22.56
2006-08-28	23:03	7.76	0	0.00	-106.03			-33.135
2006-08-28	23:18	7.76	0	0.00	4.51			1.41
2006-08-28	23:33	7.64	0	0.00	-130.85			-40.89
2006-08-28	23:48	7.53	0	0.00	-124.08			-38.775
2006-08-29	00:03	7.47	0	0.00	-69.94			-21.855
2006-08-29	00:18	7.40	0	0.00	-83.47			-26.085
2006-08-29	00:33	7.31	0	0.00	-101.52			-31.725
2006-08-29	00:48	7.21	0	0.00	-112.80			-35.25
2006-08-29	01:03	7.04	0	0.00	-184.99			-57.81
2006-08-29	01:18	6.96	0	0.00	-90.24			-28.2
2006-08-29	01:33	6.92	0	0.00	-49.63			-15.51
2006-08-29	01:48	6.78	0	0.00	-155.66			-48.645
2006-08-29	02:03	6.65	0	0.00	-153.41			-47.94
2006-08-29	02:18	6.56	0	0.00	-97.01			-30.315
2006-08-29	02:33	6.10	0	0.00	-521.14			-162.855
2006-08-29	02:48	6.08	0	0.00	-20.30			-6.345
2006-08-29	03:03	6.04	0	0.00	-45.12			-14.1
2006-08-29	03:18	6.01	0	0.00	-31.58			-9.87
2006-08-29	03:33	5.94	0	0.00	-78.96			-24.675
2006-08-29	03:48	5.92	0	0.00	-27.07			-8.46

August PFM 006016 cont'd

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² -h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² -h)
2006-08-29	04:03	5.86	0	0.00	-63.17			-19.74
2006-08-29	04:18	5.79	0	0.00	-78.96			-24.675
2006-08-29	04:33	5.70	0	0.00	-99.26			-31.02
2006-08-29	04:48	5.68	0.65	586.35	-27.07	-3,607.06	-117.35	
2006-08-29	05:03	5.64	1.30	1,172.70	-45.12	-3,005.88	-97.79	
2006-08-29	05:18	5.59	7.77	6,994.35	-58.66	-655.17	-21.31	
2006-08-29	05:33	5.56	14.24	12,816.00	-31.58	-192.53	-6.26	
2006-08-29	05:48	5.52	22.30	20,065.50	-42.86	-166.89	-5.43	
2006-08-29	06:03	5.44	30.35	27,315.00	-97.01	-277.46	-9.03	
2006-08-29	06:18	5.34	68.22	61,402.50	-110.54	-140.65	-4.58	
2006-08-29	06:33	5.28	106.10	95,490.00	-67.68	-55.37	-1.80	
2006-08-29	06:48	5.24	144.75	130,275.00	-42.86	-25.71	-0.84	
2006-08-29	07:03	5.31	183.40	165,060.00	76.70	36.30	1.18	
2006-08-29	07:18	5.38	153.00	137,700.00	81.22	46.08	1.50	
2006-08-29	07:33	5.44	122.60	110,340.00	67.68	47.92	1.56	
2006-08-29	07:48	5.51	184.20	165,780.00	83.47	39.34	1.28	
2006-08-29	08:03	5.59	245.80	221,220.00	87.98	31.07	1.01	
2006-08-29	08:18	5.66	348.80	313,920.00	76.70	19.09	0.62	
2006-08-29	08:33	5.70	451.80	406,620.00	45.12	8.67	0.28	
2006-08-29	08:48	5.82	462.55	416,295.00	139.87	26.25	0.85	
2006-08-29	09:03	5.91	473.30	425,970.00	101.52	18.62	0.61	
2006-08-29	09:18	6.04	488.55	439,695.00	139.87	24.85	0.81	
2006-08-29	09:33	6.13	503.80	453,420.00	108.29	18.66	0.61	
2006-08-29	09:48	6.30	523.50	471,149.55	184.99	30.67	1.00	
2006-08-29	10:03	6.48	543.20	488,879.10	203.04	32.45	1.06	
2006-08-29	10:18	6.62	576.50	518,849.55	155.66	23.44	0.76	
2006-08-29	10:33	6.79	609.80	548,820.00	200.78	28.58	0.93	
2006-08-29	10:48	6.96	514.80	463,320.00	191.76	32.33	1.05	
2006-08-29	11:03	7.16	419.80	377,820.00	223.34	46.18	1.50	
2006-08-29	11:18	7.38	528.30	475,470.00	245.90	40.40	1.31	
2006-08-29	11:33	7.58	636.80	573,120.00	227.86	31.06	1.01	
2006-08-29	11:48	7.81	657.15	591,435.00	252.67	33.38	1.09	
2006-08-29	12:03	7.99	677.50	609,750.00	203.04	26.01	0.85	
2006-08-29	12:18	8.18	609.05	548,145.00	221.09	31.51	1.03	
2006-08-29	12:33	8.33	540.60	486,540.00	169.20	27.17	0.88	
2006-08-29	12:48	8.45	587.80	529,020.00	135.36	19.99	0.65	
2006-08-29	13:03	8.61	635.00	571,500.00	182.74	24.98	0.81	
2006-08-29	13:18	8.77	625.85	563,264.55	171.46	23.78	0.77	
2006-08-29	13:33	8.91	616.70	555,029.10	162.43	22.86	0.74	
2006-08-29	13:48	9.05	503.15	452,834.55	153.41	26.47	0.86	
2006-08-29	14:03	9.21	389.60	350,640.00	182.74	40.71	1.32	
2006-08-29	14:18	9.29	372.05	334,845.00	92.50	21.58	0.70	
2006-08-29	14:33	9.43	354.50	319,050.00	155.66	38.12	1.24	
2006-08-29	14:48	9.60	347.15	312,435.00	196.27	49.08	1.60	
2006-08-29	15:03	9.74	339.80	305,820.00	151.15	38.61	1.26	
2006-08-29	15:18	9.88	375.45	337,905.00	162.43	37.55	1.22	
2006-08-29	15:33	9.98	411.10	369,990.00	108.29	22.87	0.74	
2006-08-29	15:48	10.12	205.55	184,995.00	166.94	70.50	2.29	
2006-08-29	16:03	10.30	224.80	202,320.00	203.04	78.40	2.55	

August PFM 006017

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-08-29	19:08	9.65	6.59	5,931.90				
2006-08-29	19:23	9.52	3.30	2,965.95	-130.00	-3,424.28	-6.94	
2006-08-29	19:38	9.49	0	0.00	-32.00			-10.00
2006-08-29	19:53	9.50	0	0.00	10.00			3.13
2006-08-29	20:08	9.47	0	0.00	-32.00			-10.00
2006-08-29	20:23	9.45	0	0.00	-12.00			-3.75
2006-08-29	20:38	9.42	0	0.00	-36.00			-11.25
2006-08-29	20:53	9.36	0	0.00	-58.00			-18.12
2006-08-29	21:08	9.29	0	0.00	-74.00			-23.13
2006-08-29	21:23	9.28	0	0.00	-8.00			-2.50
2006-08-29	21:38	9.24	0	0.00	-36.00			-11.25
2006-08-29	21:53	9.21	0	0.00	-32.00			-10.00
2006-08-29	22:08	9.18	0	0.00	-28.00			-8.75
2006-08-29	22:23	9.15	0	0.00	-30.00			-9.37
2006-08-29	22:38	9.12	0	0.00	-30.00			-9.38
2006-08-29	22:53	9.11	0	0.00	-8.00			-2.50
2006-08-29	23:08	9.08	0	0.00	-34.00			-10.62
2006-08-29	23:23	9.07	0	0.00	-6.00			-1.88
2006-08-29	23:38	9.03	0	0.00	-46.00			-14.37
2006-08-29	23:53	9.02	0	0.00	-8.00			-2.50
2006-08-30	00:08	8.99	0	0.00	-28.00			-8.75
2006-08-30	00:23	8.96	0	0.00	-32.00			-10.00
2006-08-30	00:38	8.94	0	0.00	-20.00			-6.25
2006-08-30	00:53	8.93	0	0.00	-12.00			-3.75
2006-08-30	01:08	8.90	0	0.00	-30.00			-9.38
2006-08-30	01:23	8.89	0	0.00	-8.00			-2.50
2006-08-30	01:38	8.87	0	0.00	-24.00			-7.50
2006-08-30	01:53	8.84	0	0.00	-30.00			-9.38
2006-08-30	02:08	8.83	0	0.00	-8.00			-2.50
2006-08-30	02:23	8.78	0	0.00	-50.00			-15.62
2006-08-30	02:38	8.75	0	0.00	-28.00			-8.75
2006-08-30	02:53	8.72	0	0.00	-28.00			-8.75
2006-08-30	03:08	8.70	0	0.00	-22.00			-6.88
2006-08-30	03:23	8.67	0	0.00	-28.00			-8.75
2006-08-30	03:38	8.63	0	0.00	-42.00			-13.13
2006-08-30	03:53	8.60	0	0.00	-28.00			-8.75
2006-08-30	04:08	8.58	0	0.00	-24.00			-7.50
2006-08-30	04:23	8.57	0	0.00	-8.00			-2.50
2006-08-30	04:38	8.54	0	0.00	-32.00			-10.00
2006-08-30	04:53	8.52	2.09	1,881.45	-20.00	-830.48	-1.68	
2006-08-30	05:08	8.49	4.18	3,762.90	-26.00	-539.81	-1.09	
2006-08-30	05:23	8.47	10.57	9,513.45	-26.00	-213.51	-0.43	
2006-08-30	05:38	8.44	16.96	15,264.00	-26.00	-133.07	-0.27	
2006-08-30	05:53	8.39	29.99	26,991.00	-48.00	-138.94	-0.28	
2006-08-30	06:08	8.39	43.02	3,8718.00	-2.00	-4.04	-0.01	
2006-08-30	06:23	8.34	72.06	64,854.00	-48.00	-57.82	-0.12	
2006-08-30	06:38	8.36	101.10	90,990.00	18.00	15.45	0.03	
2006-08-30	06:53	8.32	125.85	113,265.00	-42.00	-28.97	-0.06	
2006-08-30	07:08	8.31	150.60	135,540.00	-4.00	-2.31	-0.00	

August PFM 006017 cont'd

Date	Time	Dissolved oxygen mean mg/l	Global radiation W/m ²	Accumulated global radiation W/m ²	Net production versus area and time mg O ₂ /(m ² ·h)	Net production (in carbon) versus area and global radiation mg C/MJ	Net production (in carbon) versus dry biomass and global radiation (mg C·m ²)/(gdw·MJ)	Respiration mg C/(m ² ·h)
2006-08-30	07:23	8.27	180.95	162,855.00	-42.00	-20.15	-0.04	
2006-08-30	07:38	8.25	211.30	190,170.00	-18.00	-7.39	-0.01	
2006-08-30	07:53	8.25	272.35	245,115.00	0.00	0.00	0.00	
2006-08-30	08:08	8.25	333.40	300,060.00	0.00	0.00	0.00	
2006-08-30	08:23	8.26	360.35	324,315.00	4.00	0.96	0.00	
2006-08-30	08:38	8.24	387.30	348,570.00	-20.00	-4.48	-0.01	
2006-08-30	08:53	8.23	414.05	372,645.00	-10.00	-2.10	-0.00	
2006-08-30	09:08	8.23	440.80	396,720.00	6.00	1.18	0.00	
2006-08-30	09:23	8.24	456.40	410,760.00	6.00	1.14	0.00	
2006-08-30	09:38	8.23	472.00	424,800.00	-10.00	-1.84	-0.00	
2006-08-30	09:53	8.20	502.00	451,800.00	-30.00	-5.19	-0.01	
2006-08-30	10:08	8.20	532.00	478,800.00	4.00	0.65	0.00	
2006-08-30	10:23	8.19	547.05	492,345.00	-16.00	-2.54	-0.01	
2006-08-30	10:38	8.25	562.10	505,890.00	64.00	9.88	0.02	
2006-08-30	10:53	8.25	572.85	515,565.00	-2.00	-0.30	-0.00	
2006-08-30	11:08	8.31	583.60	525,240.00	60.00	8.92	0.02	
2006-08-30	11:23	8.41	592.35	533,115.00	100.00	14.65	0.03	
2006-08-30	11:38	8.48	601.10	540,990.00	68.00	9.82	0.02	
2006-08-30	11:53	8.54	601.20	541,080.00	62.00	8.95	0.02	
2006-08-30	12:08	8.61	601.30	541,170.00	70.00	10.11	0.02	
2006-08-30	12:23	8.70	593.65	534,285.00	90.00	13.16	0.03	
2006-08-30	12:38	8.83	586.00	527,400.00	128.00	18.96	0.04	
2006-08-30	12:53	8.96	589.15	530,235.00	130.00	19.15	0.04	
2006-08-30	13:08	9.06	592.30	533,070.00	98.00	14.36	0.03	
2006-08-30	13:23	9.19	580.20	522,180.00	130.00	19.45	0.04	
2006-08-30	13:38	9.30	568.10	511,290.00	116.00	17.72	0.04	
2006-08-30	13:53	9.39	558.65	502,784.55	90.00	13.98	0.03	
2006-08-30	14:08	9.54	549.20	494,279.10	152.00	24.02	0.05	
2006-08-30	14:23	9.66	528.00	475,199.55	112.00	18.41	0.04	
2006-08-30	14:38	9.79	506.80	456,120.00	130.00	22.27	0.05	
2006-08-30	14:53	9.89	475.30	427,770.00	102.00	18.63	0.04	
2006-08-30	15:08	9.95	443.80	399,420.00	66.00	12.91	0.03	
2006-08-30	15:23	10.06	425.60	383,040.00	104.00	21.21	0.04	
2006-08-30	15:38	10.14	407.40	366,660.00	82.00	17.47	0.04	
2006-08-30	15:53	10.24	376.60	338,940.00	102.00	23.51	0.05	
2006-08-30	16:08	10.30	345.80	311,220.00	62.00	15.56	0.03	
2006-08-30	16:23	10.38	307.80	277,020.00	74.00	20.87	0.04	
2006-08-30	16:38	10.39	269.80	242,820.00	16.00	5.15	0.01	
2006-08-30	16:53	10.47	238.00	214,200.00	74.00	26.99	0.05	
2006-08-30	17:08	10.48	206.20	185,580.00	12.00	5.05	0.01	
2006-08-30	17:23	10.51	160.90	144,810.00	32.00	17.26	0.04	
2006-08-30	17:38	10.50	115.60	104,040.00	-16.00	-12.01	-0.02	
2006-08-30	17:53	10.54	77.70	69,934.50	42.00	46.92	0.10	
2006-08-30	18:08	10.54	39.81	35,829.00	0.00	0.00	0.00	
2006-08-30	18:23	10.56	32.91	29,619.00	24.00	63.30	0.13	
2006-08-30	18:38	10.56	26.01	23,409.00	-4.00	-13.35	-0.03	
2006-08-30	18:53	10.55	15.80	14,222.70	-4.00	-21.97	-0.04	
2006-08-30	19:08	10.56	5.60	5,036.39	10.00	155.12	0.31	
2006-08-30	19:23	10.56	2.80	2,518.20	-2.00	-62.05	-0.13	