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Primary production and respiration in shallow phyto-benthic communities

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Keywords: In situ, macrophytes, Baltic Sea, Chara spp. Potamogeton sp. Fucus vesiculosus, Vaucheria, Surface Systems, Biosphere.

Abstract

Primary production, respiration and biomass were studied in situ in nine soft bottom vegetation community sites in the Laxemar area on the Swedish east coast, in the Baltic Sea. Primary production and respiration was calculated from measured differences in oxygen concentrations in experimental chambers. On three sites; a vegetation free/*Potamogeton pectinatus*-community, a mixed vegetation-community and a *Chara spp.*-community, studies were performed at six occasions throughout one year, May 2005 to April 2006. Additionally to oxygen concentration measurements, biomass was sampled and analysed, temperature and irradiance was measured and water samples were collected and analysed. Biomass samples from the *Chara spp.*-community were analysed for elemental content (61 elements) at four occasions.

The result shows a seasonal pattern of high primary production and respiration coinciding with high irradiance and high temperature in the three sites studied throughout one year, and also a seasonal variation in biomass in one of the sites. The annual net ecosystem production of the sites was calculated to be 28.3, 15.7 and 20.9 g carbon per square metre, respectively, less then the results from a previous modelling in this area.

Sammanfattning

Primärproduktion, respiration och biomassa undersöktes in situ i nio olika vegetationssamhällen på mjukbottnar i grunda havsvikar i Laxemar-området, norr om Oskarshamn på svenska östkusten. Primärproduktion och respiration beräknades från uppmätta skillnader i syrgaskoncentration i experimentkammare placerade i olika bentiska vegetationssamhällen. På tre platser; kal botten/*Potamogeton pectinatus*-samhälle, ett blandvegetationssamhälle och ett kransalgs (*Chara spp.)*-samhälle, utfördes studier vid sex tillfällen under perioden maj 2005 till april 2006. Utöver studier av syrgaskoncentration utfördes biomassabestämning, vattenprovtagning och mätning av temperatur och instrålning. Sammansättningen av 61 grundämnen i biomassaproverna från *Chara spp.*-samhället analyserades vid fyra tillfällen.

Resultaten visar på variationer under säsongen med avseende på produktion och respiration, som båda följde instrålnings- och temperaturkurvorna över året, för de tre lokalerna som undersöktes under hela perioden, och en säsongsmässig variation i biomassa för en av lokalerna. Den årliga beräknade nettoprimärproduktionen för de tre lokalerna var 28,3; 15,7 och 20,9 g kol per kvadratmeter, vilket är mindre än resultat från tidigare modellering för detta område.

Contents

1 Introduction

This document reports the results gained by Measurements of benthic primary production and respirations, which is one of the activities performed within the site investigation at Oskarshamn during 2005 and 2006. The work was carried out in accordance with activity plan AP PS 400-05-029. In Table 1-1 controlling document for performing this activity are listed.

The shallow benthic vegetation communities are important with respect to Net Primary Production in the marine ecosystem in Laxemar /Wijnbladh et al. 2006, Lindborg et al. 2006/. This is of importance for accumulation and turnover time for organic matter in the landscape, which is proposed to have great impact on the fate of radionuclides, should a release from a planned repository for nuclear waste to surface ecosystems occur /Kumblad et al. 2006/. This study was performed to complement the modelled estimated rates of primary production and respiration in the benthic communities. The study was performed in nine coastal sites with soft bottom communities, of which three sites (PSM007093–PSM007095) were studied repeatedly during one year (see Figure 1-1).

Original results are stored in the primary data bases (SICADA) and are traceable by the activity plan number.

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

Activity plan	Number	Version
Mätning av bentisk produktion och respiration 2005	AP PS 400-05-029	1.0
AP–tillägg 2006-10-24		–

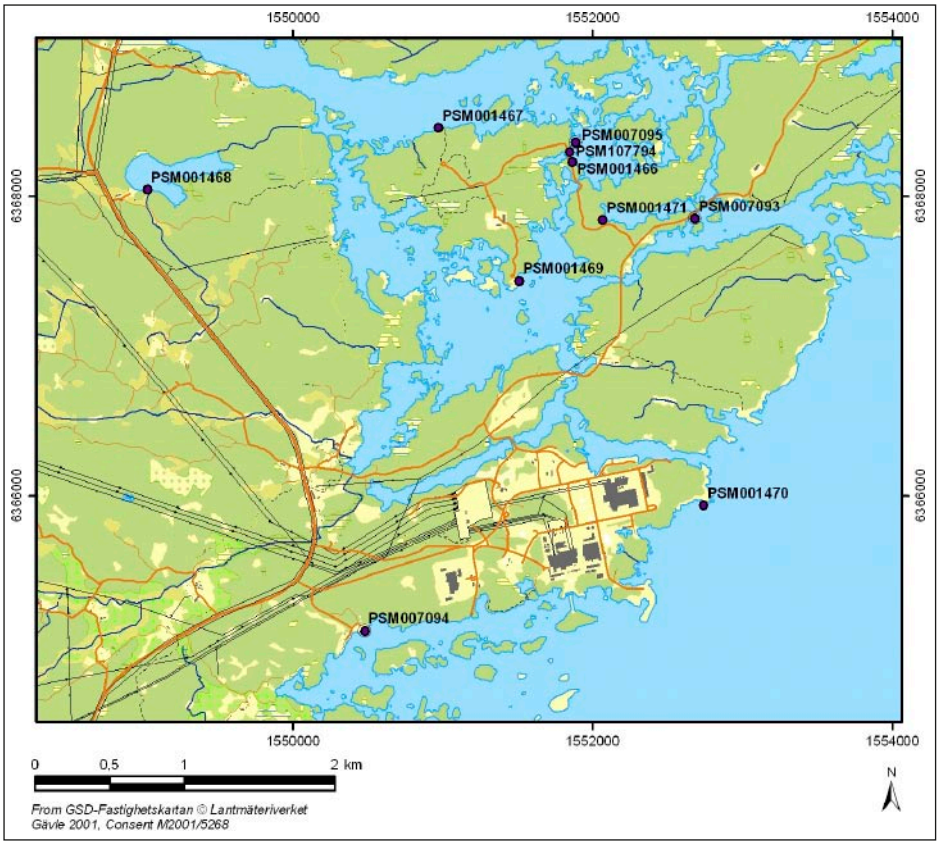

Figure 1-1. *Laxemar area and the studied sites with SICADA ID-codes. Trivial names are found in Table 3-2.*

2 Objective and scope

The primary aim of this study was to calculate primary production and respiration based on in situ measurements in benthic communities. Primary production and respiration was calculated from differences in oxygen concentrations in experimental chambers enclosing the studied communities. The study was performed in total in nine sites of which three were studied repeatedly during one year. Additionally to oxygen concentration measurements, biomass was sampled and analysed, temperature and irradiance was measured and water samples were collected and weighted. Biomass from the *Chara spp.*-community from four occasions were analysed for elemental content.

The result from this study will be used in ecosystem models describing the carbon dynamics in marine ecosystem in the Laxemar area.

3 Equipment and location

3.1 Description of equipment tools

Measurements were performed in situ using transparent acrylic cylinders to enclose the benthic community (see Figure 5-1, 5-3 and 5-7). The cylinders measured 150 or 300 mm height and 150 mm radius, thus creating a maximum volume of 10.6 or 21.2 L. A perforated lid was fitted on top of the cylinder. The hole in the lid (for probe measurements) was closed by a rubber cork. The cylinder was sealed to the sea floor by being lightly pressed into the sediment. The cylinders with lid are in the following text referred to as chambers. Controls were used in most measurements (see 4.6) and constituted of a chamber with two lids i.e. only containing water and no vegetation or sediment.

3.1.1 Oxygen and temperature measurements

Oxygen and temperature measurements were carried with two types of oxygen meters;

- Clarke (electrolyte) type “Oxi 330i” using the probe “Cellox 325” of the brand name WTW.
- Optic type ”HQ10” using the probe ”LDO” of the brand name Hach-Lange.

3.1.2 Irradiance measurements

Measurements of irradiance was performed using following equipment:

- Irradiance meter ”Li-1400” using the probe Li 192 of brand name LiCor Instruments.

3.2 Investigated sites

In total nine sites were investigated (Table 3-1). The sites were chosen to represent the most important soft bottom vegetation communities described in the marine model in the description of the surface systems /Lindborg 2006/ and within these communities the average depth was chosen. The sites were also chosen by their accessibility from the shore.

Three sites were studied at six occasions during the period May 2005 to April 2006, other sites were visited once or twice during the important period for production and respiration (summer). At each sampling occasion one to seven sub samplings were performed, i.e. repetiotions of measurements during different times of day. Number of samples and sampling occasions are presented in Table 3-2.

Table 3-1. Benthic communities investigated in this study.

Benthic community	Depth	Site name (Swedish)	ID code
Zostera marina	6 m	Utanför KSH03	PSM001470
No vegetation	1–4.5 m	Äspö norra	PSM001467
Chara spp.	1.5 m	Sketudden	PSM007095
Vaucheria sp.	1.3 m	Äspö södra	PSM001469
Potamogeton pectinatus	1.5 m	Mellan benen	PSM007093
Mixed	2.0 m	Åkvik	PSM007094
No vegetation	1–2.5 m	Frisksjön	PSM001468
Chara spp.	0.5 m	Sketudden södra	PSM107794
No vegetation	0,5 m	Mjälen	PSM001471

Table 3-2. Sites, sampling occasions (month and number of the week) and number of samples (X_n; repetition of measuring periods_number of chambers).

Site	May 2005 w. 20	July 2005 w. 28/w. 30	August 2005 w. 33	Oct. 2005 w. 42	Jan 2006 w. 03	April 2006 w. 15	July 2006 w. 27
Mellan benen PSM007093	2_5	5_5	4_5	4_5	2_5	2_5	
Åkvik PSM007094	4_5	5_5	2_5	2_5	2_5	3_5	
Sketudden PSM007095	2_4	2_5	3_5	7_5	2_5	1_5, 1_3	
Äspö norra PSM001467		3_5	.				
Frisksjön PSM001468		2_5					
Äspö södra PSM001469		3_5, 1_3/1_5					
Utanför KSH03 PSM001470		2_5	3, 2_2,4	5			
Mjälen PSM001471		– 2_5					
Sketudden södra PSM107794		2_5					3_5

4 Execution

4.1 General

Primary production and respiration was calculated from differences in oxygen concentrations in the experimental chambers enclosing the studied communities. The study was performed in total in nine sites, of which three were studied repeatedly during one year. At each sampling occasion, all sites were sampled during the same calendar week, but different sites were investigated at different days. The actual dates and times are found in Appendix 1a and b (and in the database SICADA).

In addition to measurements of oxygen concentration (mg L^{-1}), oxygen saturation (%) and temperature (°C) was measured, water was sampled and biomass samples were taken. Irradiance measurements in the water column were performed at least once at each measuring occasion.

All measurements, times etc were noted on plastic protocols. These were digitalised by a person the same or the following day.

Figure 4-1. *Preparing to measure production at site PSM007093 in October 2005. Peter Plantman in the water and Erik Wijnbladh on land. The site is marked with a red buoy to the far left in the figure. Photo: Curt-Robert Lindquist.*

4.2 Preparations

Before each measuring day, oxygen meters were checked to show reliable (100–110% oxygen saturation) values by measuring well oxygenated tap water in room temperate. There was a set of several meters to be used and any meter failing was not used.

Cylinders and lids were rinsed from sediment in sea water after use in one site, before use in the next. Probes/meters were handled as directed in the manual for each meter; the Hach-Lange meters were kept as wet storage during the measuring days.

4.3 Execution of field work

4.3.1 Oxygen measurements and water sampling

Two to three persons were involved in the field work; one diver/wader, measuring and sampling, and one or two persons on land communicating with diver, reading measurements and noting results.

The following steps were performed

1. **Placing of the cylinders on the sediment.** Cylinders were lightly (2–5 cm) inserted in the sediment. In very soft sediment (e.g. site PSM007093) a plastic ring was attached on the cylinder to ensure that the cylinder did not sink into the sediment.
2. **Fitting of the lid and sampling of water.** This was done after waiting for disturbed sediment to settle (typically 15–30 min). Fitting of the lid was done carefully not to disturb the sediment and the cork was inserted after the lid was fitted. Water sampling of was done using a 60 ml plastic syringe that was inserted approximately 10 cm into the chamber.
3. **Measuring start.** Measurement of oxygen concentration and temperature. The water in the chamber was circulated by careful rotating the measuring probe within the chamber to homogenise the water. Measurements in the chambers were performed approximately 10 cm from the lid by removing the cork, and inserting the probe. While measuring, the hole was tightened by hand/glove by the diver/wader. When divers were used, start of the measurement was signalled to the person on land by pulling the cord lightly. Measuring was continued until a stable result was obtained (Oxi 330i) or until the device signalled stable result (HQ10). The end of each measuring was signalled to the diver by pulling the cord lightly. The measuring was performed in free water (called “void” in protocols and Appendix 1) and then in chamber 1–5 and in the control chamber.
4. **Measuring stop/new start.** Measuring was repeated as above.

When measuring respiration, the same procedure as described above was followed, but a non-transparent black cylinder was put on top of the chamber restricting light penetrating the chamber, or measurements were performed during dark hours.

Differences between the second and first, the third and second measurement etc was used for production or respiration calculations. Normally, the stop measurement of a production period was the same as the start of respiration measurements, or vice versa. Sampling of water was performed once for start and once for stop of production and respiration respectively, i.e. three samples from each chamber of which one of the samples represent both start of production and stop of respiration (or vice versa).

Normally, one respiration (n=5) measurement was performed at each occasion and one to seven repetitive production (n=5) measurements (se Table 3-3) at different intervals of the day.

4.3.2 Irradiance measurements

Irradiance measurements were made by measuring PAR (μE s^{-1} m^{-2}) immediately below the surface and then every half metre to the total depth of the studied site. The probe was held at the correct depth by the diver, careful not to shade the probe and not measuring in the water column affected by disturbed sediment.

4.3.3 Biomass

Biomass samples were taken by hand by the diver. The lid from the cylinder was removed and all living macrophytes were taken from within the cylinder. Macrophytes, and attached fauna, were placed in net bags and transported to marked plastic bags on land. In sites with fine sediment (most sites), sampling was made in several steps as visibility quickly decreased to zero, so the diver had to wait for sediment to settle to ensure that all the macrophytes were sampled.

Biomass samples were frozen and later rinsed, and dead material was separated from living and determined to taxonomic level. Biomass samples were put in paper (small samples) or aluminium (large samples) containers and weighted after at least one week drying in 60°C. The samples were put in plastic bags and stored or analysed (see 4.3.3.).

4.3.4 Elemental content in *Chara spp.*

Five samples from the biomass sampling occasions in July, October, January and April were analysed for 61 elements, including macroelements as carbon, nitrogen and phosphorous. The samples were treated as other biomass samples, see 4.3.3. The samples were placed in marked plastic bags and sent to a laboratory, Analytica AB, that performed the analyses. For further information on the analyses, see /Engdahl et al. 2007/.

To facilitate sampling of *Chara spp.* within the cylinders, a metal knife was used for sampling. *Chara spp.* was dried in aluminium containers. This treatment might contaminate the samples with trace elements or metals.

4.4 Data handling/post processing

4.4.1 Primary production and respiration

Net primary production (NPP) and respiration (R) was calculated by

$$NPP \text{ or } R = \left[\frac{\Delta C_{O_2} \cdot V}{A} \right] \cdot \frac{1}{T}$$

where

C_{O2} = Oxygen concentraion (mg L^{-1})

V = chamber volyme (dm^3)

A = chamber surface (m^2)

T = time interval (h)

Gross primary production was calculated by:

$GPP = NPP + R$

Net primary production (NPP_{oxygen}) or respiration (R_{oxygen}) of oxygen in ($mgO_2\ m^{-2}\ h^{-1}$) was recalculated to carbon ($mgC\ m^{-2}\ h^{-1}$) by:

$NPP_{oxygen} \cdot 0.3125 = NPP_{carbon}$

$R_{oxygen} \cdot 0.3125 = R_{carbon}$

The factor is calculated from the quota between number of carbon and oxygen atoms involved in photosynthesis of 1.2 /Guterstam et al. 1978/ and molar weight of carbon and oxygen.

4.5 Analyses and interpretations

4.5.1 Environmental conditions and water chemistry

Two sets of data describing abiotic conditions were used; measurements and water chemistry analyses from this study and measurements of Global Irradiance, average irradiance every 30 min ($W\ m^{-2}$) from continuous logging at the Äspö Meteorological station /Sjögren et al. 2007/.

The first data set, comprising temperature (°C), dissolved oxygen ($mg\ L^{-1}$ and % saturation), pH and nutrient and carbon concentrations ($mg\ L^{-1}$), was used only for descriptive statistics. The presented data of these parameters are from free water measurements from the sampling occasions, i.e. there is a bias towards day time measurements. Accordingly, these figures likely overestimate the daily values, but they can be used to indicate within-year variations.

The second data set is presented as accumulated irradiance ($MJ\ day^{-1}\ m^{-2}$ or $MJ\ month^{-1}\ m^{-2}$) each day or month. This is calculated by multiplying average irradiance ($W\ m^{-2} = J\ s^{-1}\ m^{-2}$) with time (s).

4.5.2 Biomass, primary production and respiration

Data is presented as averages for each sampling occasion.

4.5.3 Net ecosystem production

Net ecosystem production (NEP) refers to the total gross primary production minus respiration in the investigated sites within the chambers. Net Ecosystem Production was calculated as:

$$NEP_{month} = \left[\left(\frac{GPP_{period}}{I_{period}} \right) \cdot I_{month} \right] - R_{month} \cdot 24 \cdot 30.4$$

where

NEP_{month} = Net Ecosystem Production during one month ($mg\ C\ m^{-2}$)

GPP_{period} = Average Gross production during the measurement period ($mg\ C\ m^{-2}\ h^{-1}$)

I_{period} = Global Irradiance the measurement period (MJ)

I_{month} = Global Irradiance the month ($MJ\ month^{-1}$)

R_{month} = Average Respiration the measurement period ($mg\ C\ m^{-2}\ h^{-1}$)

Time factors: $24\ h\ day^{-1}$, $30.4\ days\ month^{-1}$

Respiration was assumed to be constant during a 24 hour cycle and during the month and the results from NPP and R measurements from a specific sampling occasion was assumed to represent the whole calendar month. NPP and R were interpolated between months when no measurements were performed (i.e. June, September, November, December, February and March).

4.6 Nonconformities

4.6.1 Water chemistry

Water chemistry was only analysed in May 2005 but the samples are saved for possible later analyses. Some of the analysed samples were “contaminated” with sediment (because there was sediment in the water) and are likely to show values that do not represent the dissolved water concentrations. This is further discussed in Section 5.6.

4.6.2 Biomass

Biomass was not sampled in site PSM107794.

4.6.3 Primary production and respiration

Controls were not used the first measurement period in May and not in PSM001468 in the July measurements.

Primary production and respiration measurements in the afternoon sampling in July at site PSM007095 gave unreliable results. Oxygen saturation levels between 220 and 270% was noted, and in that range the used oxygen meter is not reliable. The calculated primary production and respiration based on these figures were 303 and 241 mg C m^{-2} h^{-1} respectively, which is approximately 5 times higher than the highest other production or respiration measurement.

5 Results

Results below are presented in more detail for the three sites being investigated during one year (PSM007093-7095). These data, and data from the other sites, are stored in the database SICADA by the activity plan number AP PS 400 05 029 and by this P-report number. Raw data is found in Appendix 1.

5.1 Site description and environmental conditions

5.1.1 PSM007093 – *Potamogeton pectinatus*, Mellan benen

The site PSM007093 is located in Getbergsfjärden approximately 10 m from the shore and at a depth of 2 m. The vegetation community consisted of very fine organic sediment substrate on which *Potamogeton pectinatus* grew (se Figure 5-1).

The *P. pectinatus* was the only macrophyte found in this site, and it was found in low densities. As seen in Figure 5-11 (and right in Figure 5-1) macrophytes were not present in May 2005 or in January and April 2006. One experimental chamber was decided to contain no vegetation at each of the sampling occasions.

Average oxygen saturation in the free water was over 100% at all occasions except in January, and over 130% in the July measurements. In July temperature was high; 23.7°C (see Figure 5-2). The relatively high oxygen concentration in April, when there was still ice cover, can be explained by ice break up close to (approx. 20 m) the site.

5.1.2 PSM007094 – Mixed vegetation, Åkvik

The site PSM007094 is located south of the Simpevarp peninsula, approximately 10 m from the shore and at a depth of 2 m. The site is close to a small private jetty used for a small recreational fishing boat. The vegetation community was a mixture of different vascular plants (e.g. *P. pectinatus, Ruppia sp.* see Figure 5-3), non-attached *Fucus vesiculosus* and filamentous algae. The composition of algae and plants varied during the year although biomass was fairly constant (Figure 5-11). The substrate was sand with clay and organic sediment (see Figure 5-3).

Figure 5-1. *Photograph taken in October (left) and in April (right) of the site PSM007093. The April picture is taken under ice and there was strong colouring of the water.*

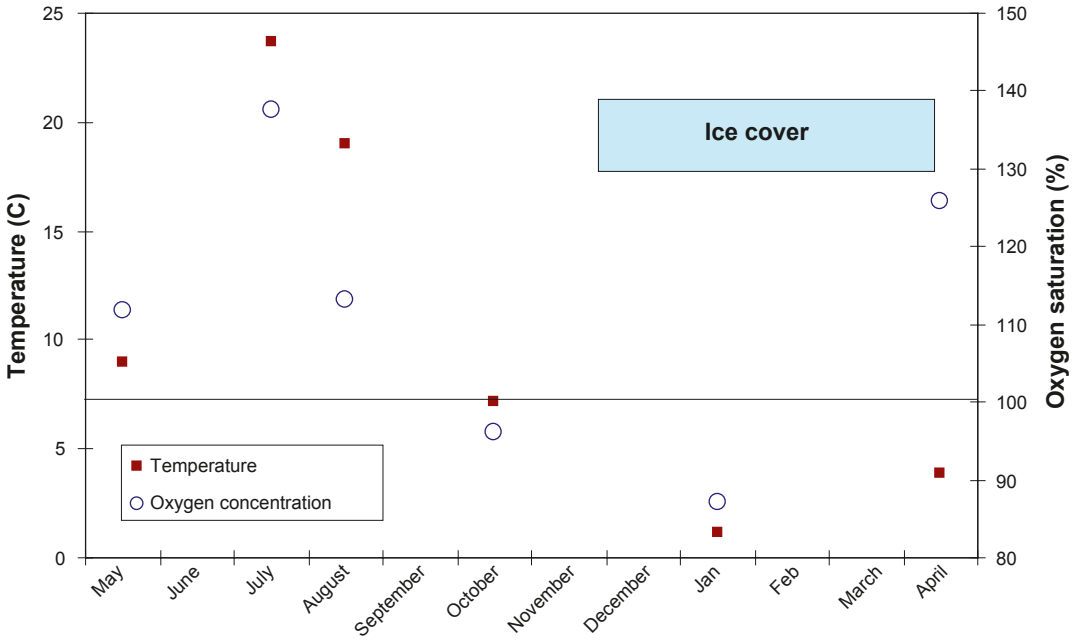

Figure 5-2. *Oxygen saturation and temperature in site PSM007093 at the sampling occasions. Oxygen saturation of 100% is indicated with a line.*

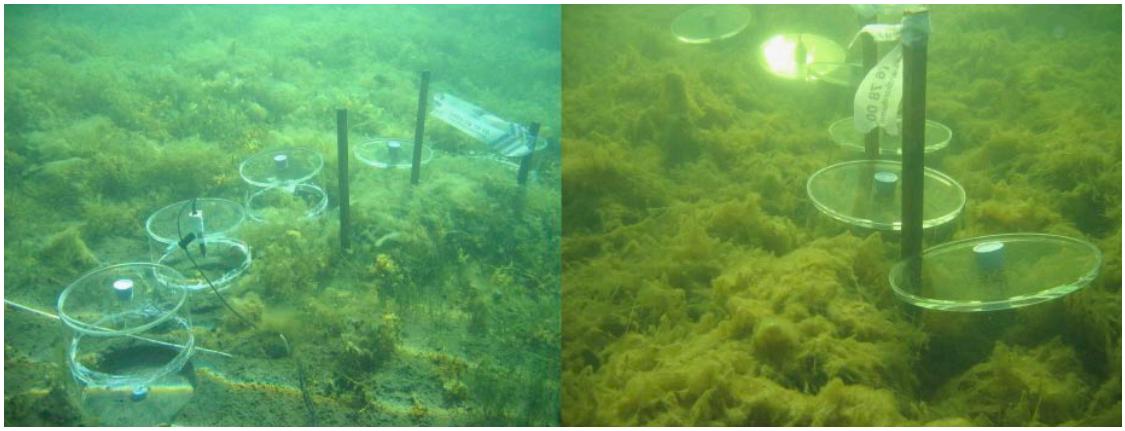

Figure 5-3. *Photograph taken in October (left) and in April (right) of site PSM007094.*

No ice cover was noted at this site, probably due to short water turnover time in the area; a weak current was noticed at all times during the study.

Average oxygen concentration in the free water was between 100 and 120% at all occasions. In July the temperature reached nearly 25°C (see Figure 5-4).

5.1.3 PSM007095 – *Chara spp.*, Sketudden

The site PSM007095 is located at Sketudden east of Äspö, close to the shore and at a depth of 1.5 m. The vegetation community was solely consisting of *Chara spp.* in high densities (100% coverage except in May 2005). The substrate was sand, gravel and organic sediment in between boulders (see Figure 5-5). Since *Chara spp.* sometimes was mixed into the organic sediment it was difficult to determine what was living and dead algae. The visibility was poor at all occasions.

The site was ice covered from January to April, but the ice break-up was one or two days after the sampling occasion in 2006-04-09.

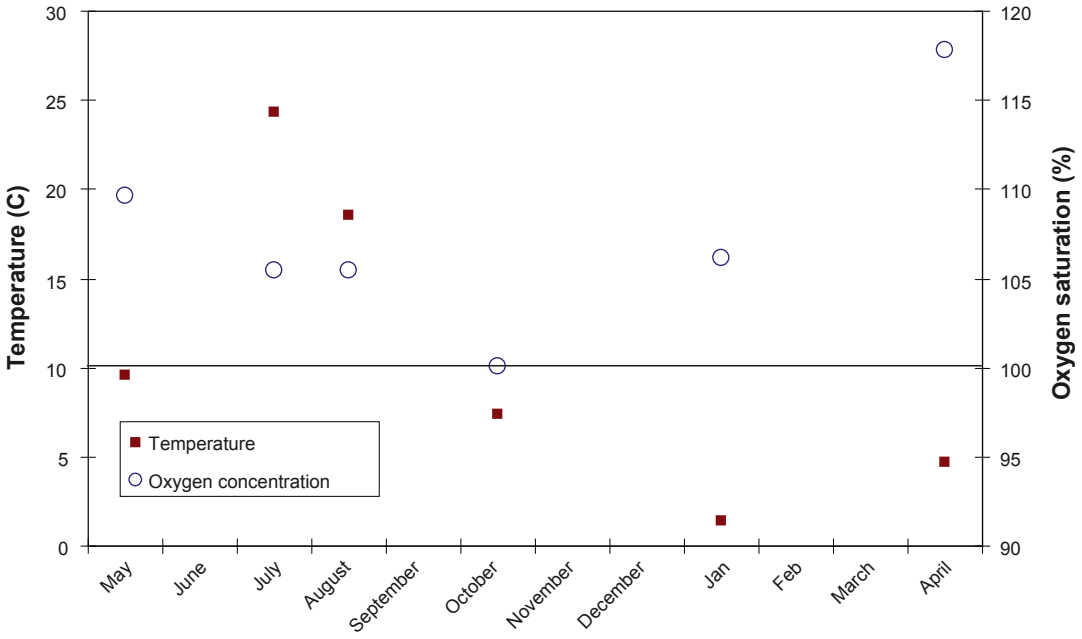

Figure 5-4. *Oxygen saturation and temperature in site PSM007094 at the sampling occasions. Oxygen saturation of 100% is indicated with a line.*

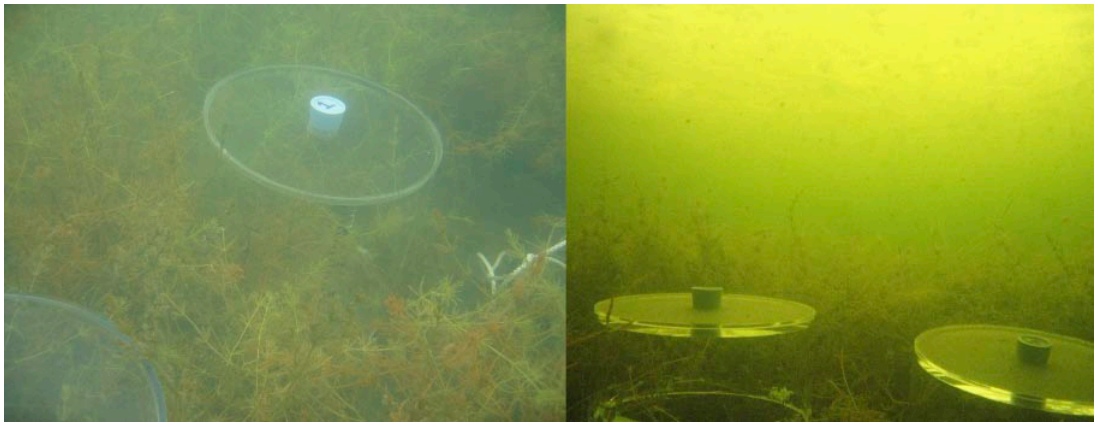

Figure 5-5. *Photograph taken in October (left) and January (right) of the site PSM007095. Note the ice cover in the January photograph.*

Average oxygen concentration in the free water varied extremely between summer (159% in July) and winter/spring (50.2% in April). In July, temperature reached 27°C and as described earlier some of the measurements were omitted due to unreliable, high oxygen measurements (see Figure 5-6 and Section 4.6.3; including these measurements would give an average of 177% oxygen saturation). The large within-year variation can be explained by a very large biomass resulting in high primary production and respiration in combination with very little water movement and a long period of ice cover.

5.1.4 PSM001470 – *Zostera marina*, utanför KSH03

This site was a sand bottom approximately 20 m from the shore at a depth of 6 m. The vegetation was dense but patchy and the chambers were set out so to cover a range from low density to 100% bottom cover of *Zostera marina*. The site is located at the open coast with fast water turnover. Oxygen saturation in the free water was around 110% at all sampling occasions, temperature was 18.2°C in July and 16.6°C in August. Two chambers were accidentally opened during the measuring period and could thus not be used.

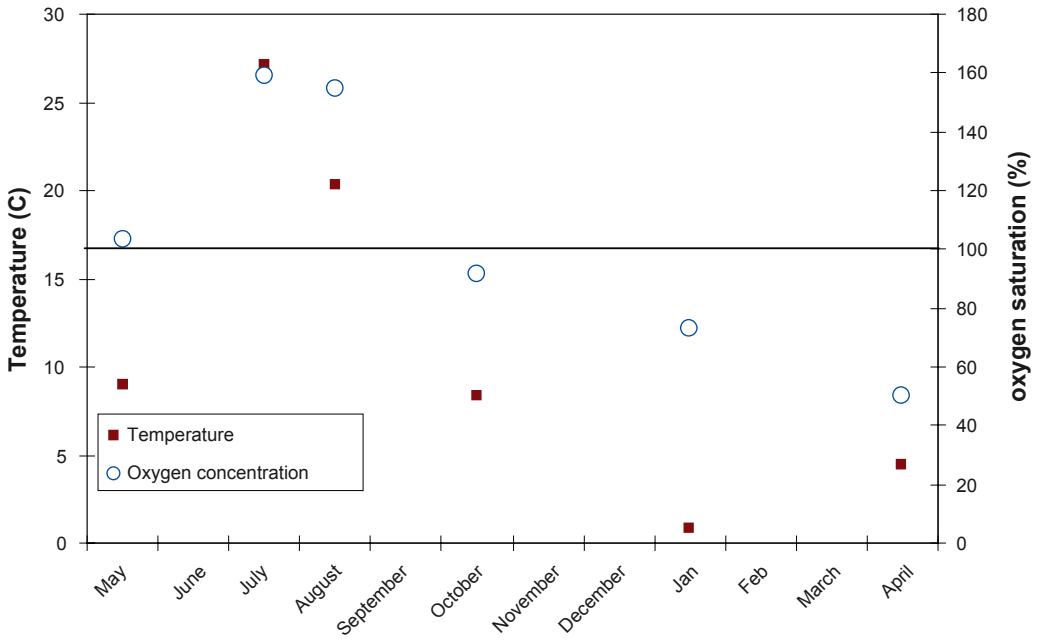

Figure 5-6. *Oxygen saturation and temperature in site PSM007095 at the sampling occasions. Oxygen saturation of 100% is indicated with a line.*

5.1.5 PSM001467 – No vegetation, Äspö norra

This site was a macrophyte free sediment bottom with some visible clams present at a depth of 3.7–5.1 m. The temperature was on average 18.9°C in the free water and the oxygen saturation averaged 92% at the sampling occasion in July. The chambers were set out at different depths; chamber 1: 3.7 m, chamber 2: 4.0 m, chamber 3: 4.3 m, chamber 4: 4.6 m, chamber 5: 5.1 m.

5.1.6 PSM001469 – *Vaucheria sp.*, Äspö södra

This site was a shallow, 1.3 m depth, approximately 25 m from the shore, with a thin sediment layer on hard substrate on which *Vaucheria sp*. grew. At the sampling occasion in July the average temperature was high; 25.6°C and the oxygen saturation 111%.

5.1.7 PSM001468 – No vegetation, Lake Frisksjön

This was the only lake site. The chambers were set out on depths between 2.2 and 2.5 m. Due to the extremely low visibility and soft sediment, exact depth measurements were not made. Oxygen saturation differed strongly from July measurements in the marine sites in; average oxygen saturation in the free water was 70.6% in the upper water and only 8.3% in the bottom water. Surface temperature was 24.3°C.

5.1.8 PSM107794 – *Chara spp.*, Sketudden södra

Measurements in this site were performed by students in July 2005 and 2006 respectively. The site is a shallow *Chara spp.* community, similar to PSM007095 but at only 0.5 m depth. As in site PSM007095 the temperature was high in July 2005 with 23.7°C and oxygen saturation of 124% and in July 2006 the temperature was 24.8°C and oxygen saturation on average 146% in the free water.

5.1.9 PSM001471 – No vegetation, Mjälen

This site was an empty sediment bottom (i.e. no macrophyte vegetation) of a depth of 0.5 m; it was studied by students in July 2005. The temperature was 21.5°C and the oxygen saturation 103%.

5.2 Water chemistry

Analysis of water chemistry was made on samples taken in May 2005 from three sites (see Tables 5-1 and 5-2 below). Samples were taken both from the experimental chambers and from the control chamber. Concentration of inorganic carbon (IC) decreased as would be assumed during the net production period and increased during the respiration period (see Figure 5-7). In site PSM007093 and 7095 there were no systematic differences between controls and experimental chambers with regards to nitrogen and phosphorous or pH (Table 5-1 and 5-2), but in site PSM007094 there was an increase of concentration of nitrogen and phosphorous (including NH_4, NO_3-NO_2 and PO_4) during the measurement period, regardless of light or dark measurements. All results from chemical analyses are presented in Appendix 2.

In total four samples were discarded as the laboratory found “some sediment” or “sediment” in the samples. See Appendix 2.

Table 5-1. Total Phosphorous and Nitrogen, Inorganic carbon (IC) and pH in the three sites in May 2005. Mean Chamber denotes mean of experimental chambers (N=5), Control denotes control chamber (N=1), na denotes not analysed.

	Tot-P µg/l		TOT-N µg/l		IC mg/l		pH	
PSM007093	**Control**	**Mean Chamber**	**Control**	**Mean Chamber**	**Control**	**Mean Chamber**	**Control**	**Mean Chamber**
06:45	20.6	21.9	297.0	313.6	14.8	15.2	8.7	8.7
16:45	34.5	24.0	356.0	335.3	14.6	14.0	8.8	9.0
09:15	24.8	24.3	315.0	336.3	15.0	15.8	8.5	8.3
PSM007094								
05:40	na	22.0	na	295.0	na	16.1	na	8.8
15:00	20.8	36.5	290.0	326.6	15.1	15.5	8.9	9.0
08:00	21.7	62.6	273.0	368.0	16.8	17.1	8.5	8.3
22:00	23.5	61.5	302.0	373.2	14.7	15.7	8.9	8.7
PSM007095								
13:00	24.4	25.0	571.0	585.6	13.4	13.1	8.7	8.8
20:00	24.1	23.4	529.0	542.5	13.6	13.0	8.6	8.7
09:00	23.2	22.3	570.0	564.5	13.4	14.2	9.0	8.7

Table 5-2. Ammonium, Phosphate and Nitrite/Nitrate concentrations at the three sites in May 2005. Mean chamber denotes mean of experimental chambers (N=5), Control denotes control chamber (N=1).

	NH4-N µg/l		PO4-P µg/l		(NO2+NO3)-N µg/l	
PSM007093	**Control**	**Mean Chamber**	**Control**	**Mean Chamber**	**Control**	**Mean Chamber**
06:45	1.3	1.3	7.9	8.4	0.3	0.2
16:45	1.5	3.0	12.2	8.1	0.4	0.4
09:15	1.6	4.0	8.9	6.3	0.2	0.3
PSM007094						
05:40	n	1.3	n	10.6	n	0.5
15:00	1.4	9.5	10.4	23.0	0.5	0.9
08:00	1.0	14.5	11.2	44.1	0.4	1.7
22:00	2.6	23.8	12.6	46.0	0.5	1.8
PSM007095						
13:00	2.4	2.4	3.5	3.2	0.8	0.6
20:00	2.6	2.7	3.3	2.7	0.7	0.5
09:00	2.4	16.5	2.7	2.3	0.4	0.7

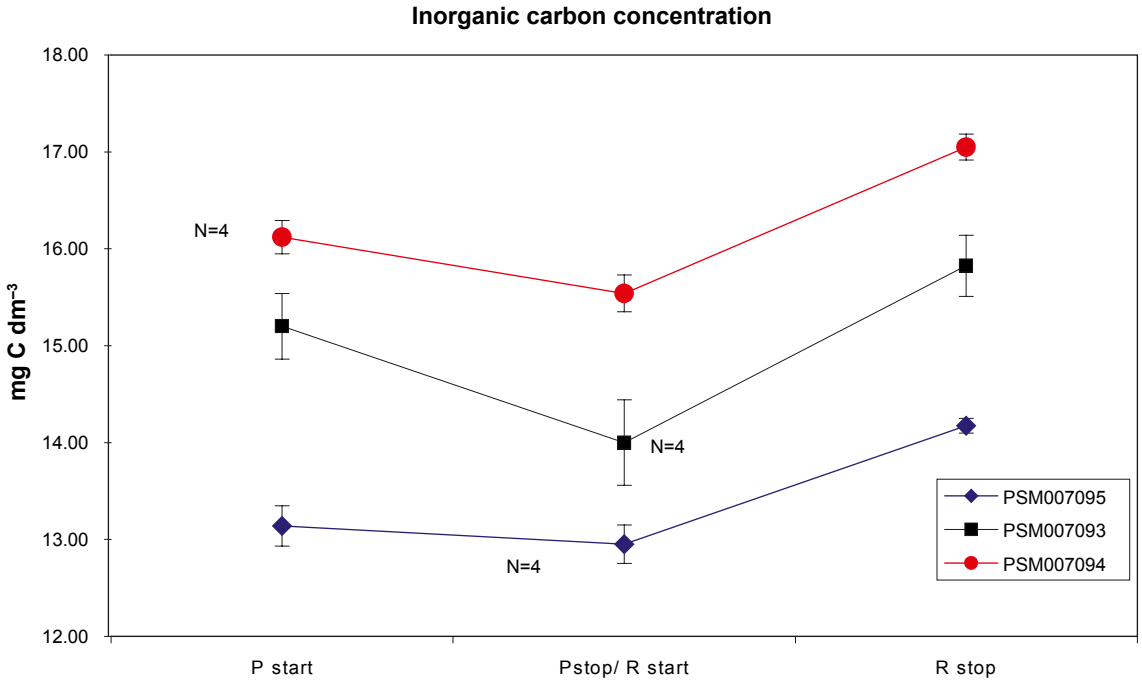

Figure 5-7. Mean concentrations of inorganic carbon in experimental chambers at start and stop of the production and respiration periods, respectively (N=5, or noted in the figure, error bars denote SE of mean).

5.3 Elemental content in *Chara spp.*

The total content of the 61 analysed elements was larger in July 2005 than in the other occasions (see Figure 5-8). Excluding calcium, however, the content of the 60 other element is actually less in July than the other months (see Table 5-3).

Table 5-3. The ten largest constituent elements in dried samples of *Chara spp.* (g kgDW^{-1}) from the different sampling occasions.

	July	October	January	April
C	263	314	334	329
Ca	171	51.8	32.6	20.0
N	10.4	10.1	17.3	13.9
Si	3.77	3.32	7.32	9.36
Mg	5.25	6.85	5.52	6.47
K		4.27	4.58	4.61
Na	4.42	9.00	5.32	4.24
Cl	6.65	4.09	4.54	2.32
Sr	2.66			
S	3.08	5.43	5.56	7.50
Total (61 elements)	475	411	421	401
Total (excl. Ca; 60 elements)	304	359	388	381

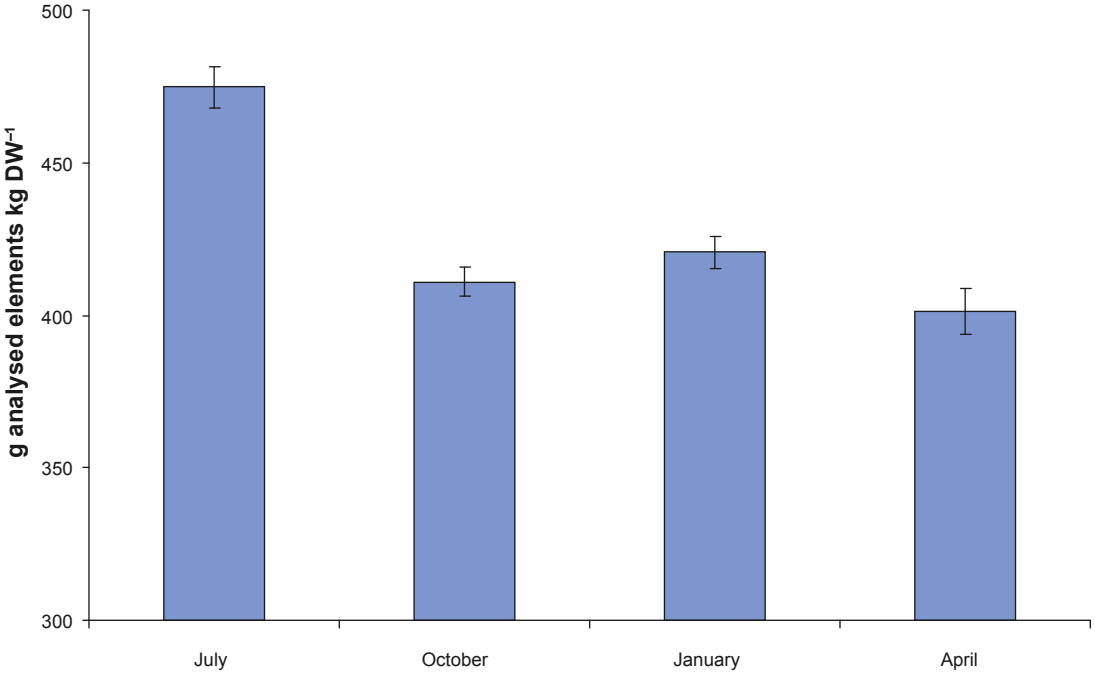

Figure 5-8. *Total content of 61 analysed elements (g kgDW^{-1}) in dried samples of Chara sp. (N=5, error bars denote SEM).*

There is a large decrease in calcium (Figure 5-9), and a following well correlated decrease of strontium (Figure 5-10) during the studied period. The content of calcium is high; in July it constitutes 17% of the dry weight, and is, although the decrease, the second largest analysed element, followed by nitrogen and chlorine (July), sodium (October) and silica (January and April), see Table 5-4. Calcium is known to be deposited on macrophytes in the form of $CaCO_3$ in hard-water lakes /Wetzel 1982/ due to the use of CO_2 in photosynthesis, and this is a likely explanation as Ca content is high when production is high (July 2005).

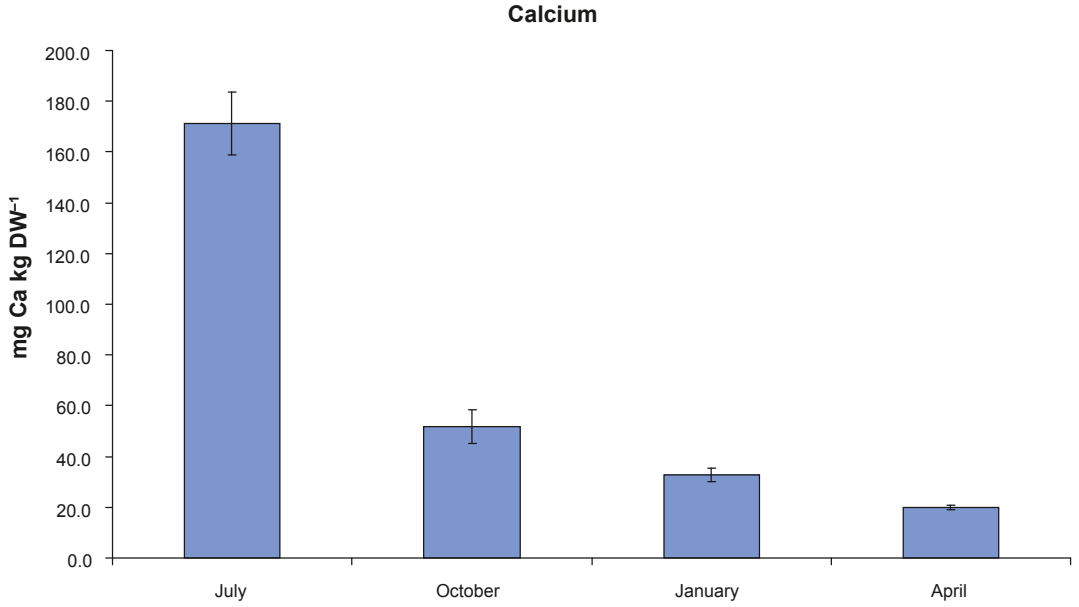

Figure 5-9. *Calcium content in dried samples of Chara spp. (g kgDW^{-1}, N=5, error bars denote SEM).*

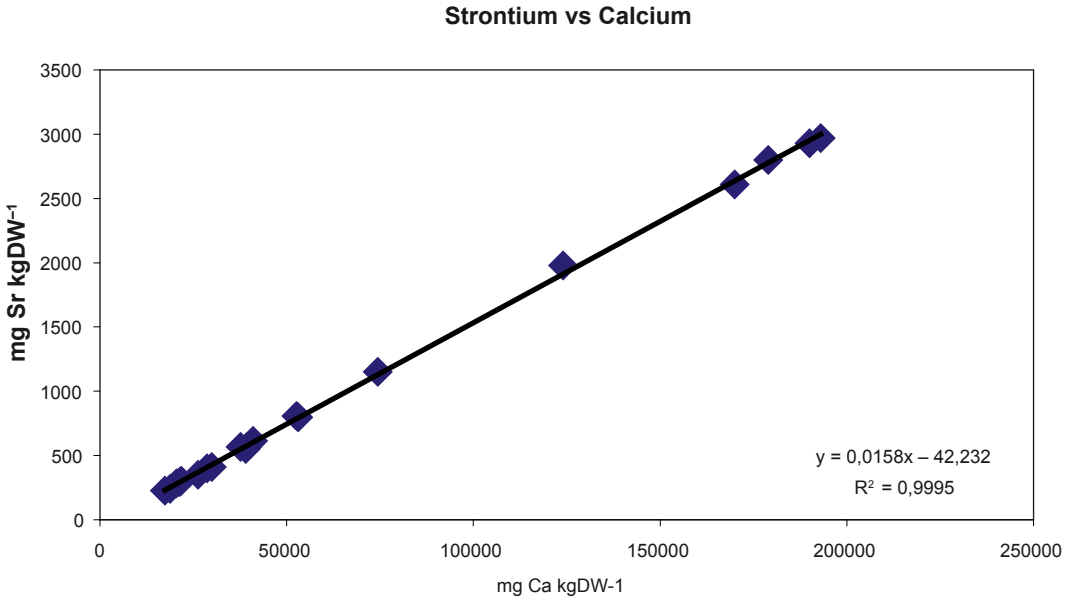

Figure 5-10. *Correlation of Calcium and Strontium content in the Chara spp. samples.*

Table 5-4. Mean molar ratios of carbon, nitrogen, silica and calcium content in *Chara spp.* samples at the different sampling occasions.

	Juli	Oktober	Januari	April
C:N	30:1	36:1	27:1	32:1
C:P	893:1	1,470:1	1,024:1	994:1
N:P	30:1	40:1	44:1	35:1
C:Ca	5:1	22:1	35:1	55:1
C:Si	369:1	545:1	267:1	196:1

The molar ratios of C, N, P, Si and Ca are found in Table 5-4. The ratios of C:P (870–1,384:1) and N:P (29–45:1) found in the *Chara spp.* samples are higher than the Redfield ratio (106:1 and 16:1 respectively) /Sterner and Elser 2002/. Higher N:P and C:P ratios has been correlated to decreased growth rate in algae /Sterner and Elser 2002/.

The list of elemental content of the 61 elements in all samples is presented in Appendix 3.

5.4 Biomass

There was a large difference in biomass between the three annually studied sites (Figure 5-11). In PSM007093 there were no macrophytes present in winter/spring, and biomass reached its maximum (24 mg DW m^{-2}) in October. The lack of biomass in winter/spring is due to that *P. pectinatus* is an annual plant. In PSM007094, a mixed vegetation community, biomass was relatively constant between 51 and 96 g DW m^{-2}. The *Chara spp.* community (PSM007095) had much higher biomass throughout the year – between 210 and 270 g DW m^{-2} – except in May when the biomass was only 24 g DW m^{-2}.

In the other sites where biomass was sampled, mean biomass varied between 22 and 170 g DW m^{-2}, see Figure 5-12.

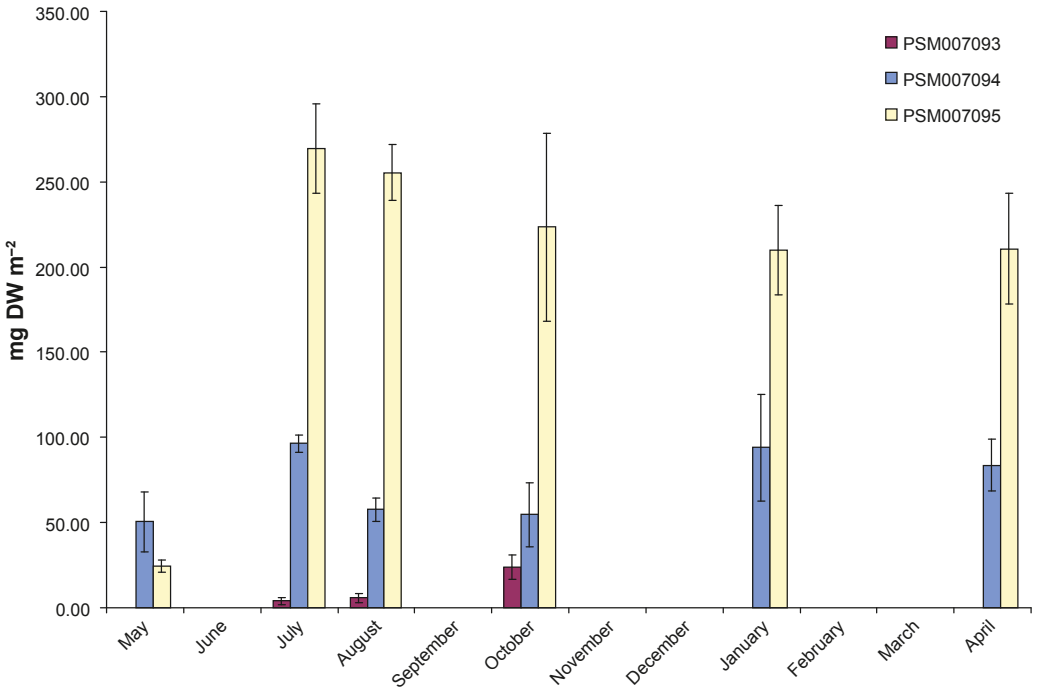

Figure 5-11. *Mean biomass (g DW m^{-2}) at the Potamogeton pectinatus. site (PSM007093), the mixed vegetation site (PSM007094) and the Chara spp. site (PSM007095) (N=5, error bars denote SEM).*

5.5 Net production and respiration

5.5.1 Annual measurements

Net Primary Production (NPP) was highest in July (*P. pectinatus,* PSM007093), August (*Chara spp.*, PSM007095) and April (Mixed vegetation, PSM007094). The highest NPP was found in the *P. pectinatus* site with 90 mg C m^{-2} h^{-1}, despite its low biomass. The mixed vegetation site, i.e. the site with no ice cover, showed the smallest variation during the year; NPP varied between 11 and 33 mg C m^{-2} h^{-1}. The *Chara spp.* site showed negative NPP in April, and NPP close to zero in January, but high NPP in August (75 mg C m^{-2} h^{-1}). In Figure 5-13, the NPP is presented together with accumulated irradiance for each month.

Respiration was highest in May (*P. pectinatus*) and July (Mixed vegeation) and lowest in January (all sites). In Figure 5-14 average temperature is presented together with respiration (respiration is displayed as negative values). It is clear that respiration was highest during the warmest period in site mixed vegetation site, and there is also a trend towards this in the *Chara spp.* site. In the *P. pectinatus* site there is no obvious trend. January, the coolest month, showed the lowest respiration. In July no measurement of respiration was made in PSM007095 (*Chara spp.*).

5.5.2 All/other sites

Measurements of net production and respiration in other sites were made in July (and for the *Zostera marina* site also in August) and are presented in Figure 5-15 and 5-16. All sites except the lake site (PSM001468) showed positive net primary production and were within the range of the annually measured sites. It the lake site there were no macrophytes and there was a low light penetration. The other sites with "no vegetation" (i.e. no macrophytes) had lower net production than site the *P. pectinatus* site, which in this summer sampling occasion had a small biomass.

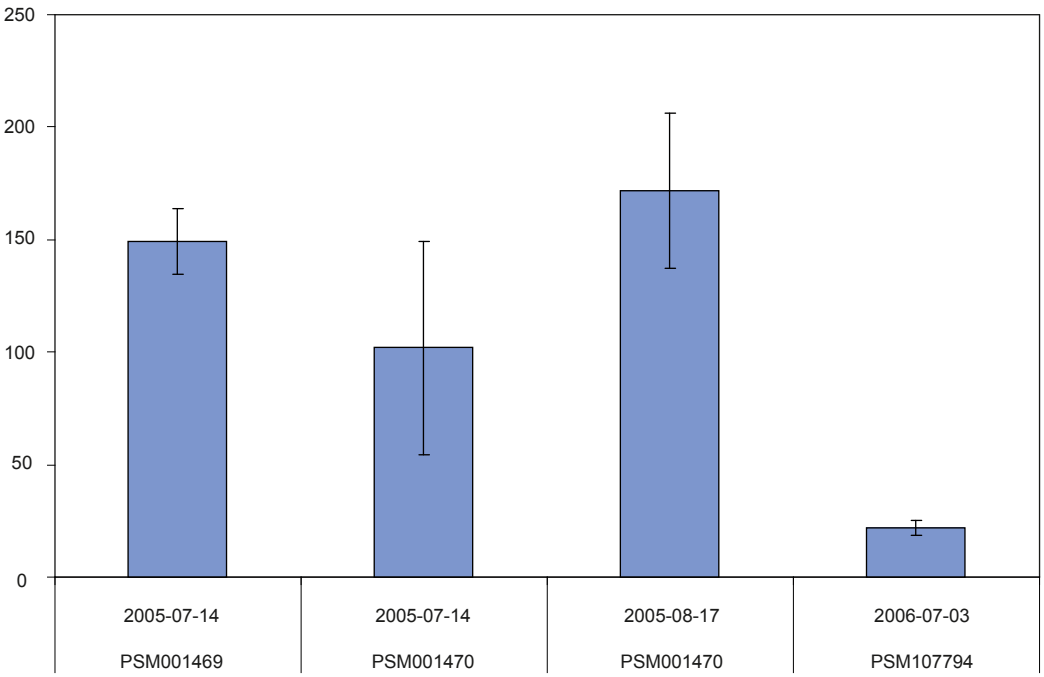

Figure 5-12. *Mean biomass (g DW m^{-2}) at the Vaucheria site (PSM001469), the Zostera marina site (PSM001470), and one Chara spp. site (PSM107794) (N=5, error bars denote SEM).*

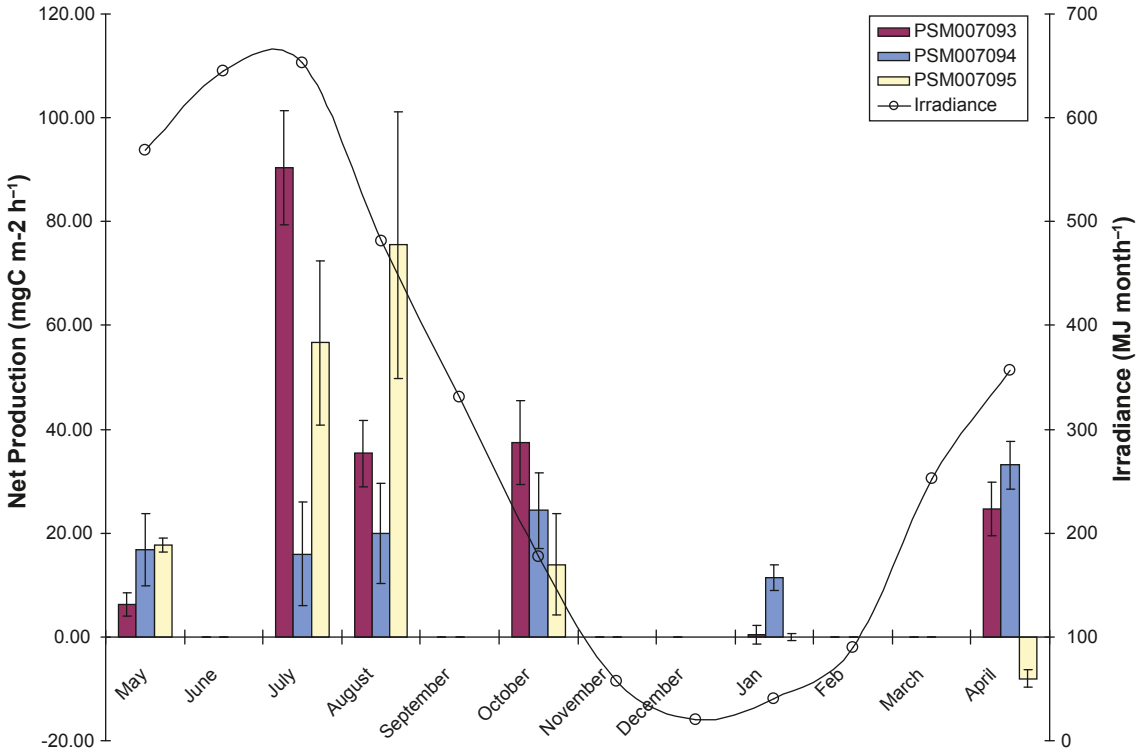

Figure 5-13. *Mean Net Primary Production at the Potamogeton pectinatus site (PSM007093), the mixed vegetation site (PSM007094) and the Chara spp. site (PSM007095) and monthly measured irradiance (above water) (N=5, error bars denote SEM).*

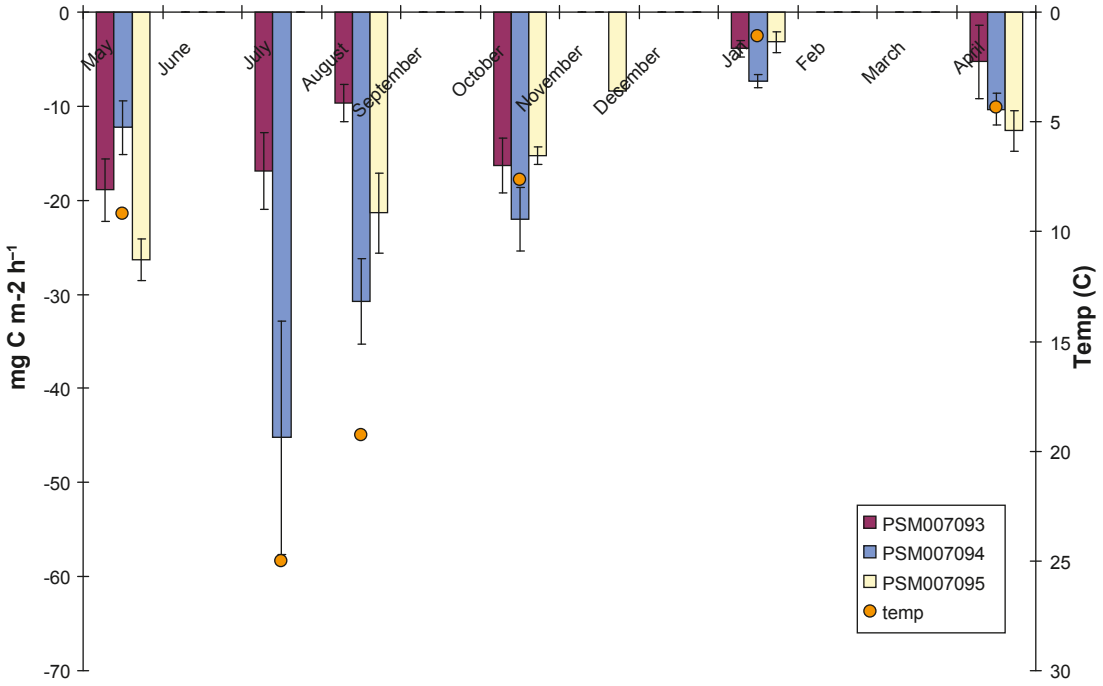

Figure 5-14. *Mean respiration at the Potamogeton pectinatus site (PSM007093), the mixed vegetation site (PSM007094) and the Chara spp. site (PSM00709) (N=5, error bars denote SE). Data from site PSM007095 is missing for the July sampling. Red circles indicate temperature measured in this study (°C).*

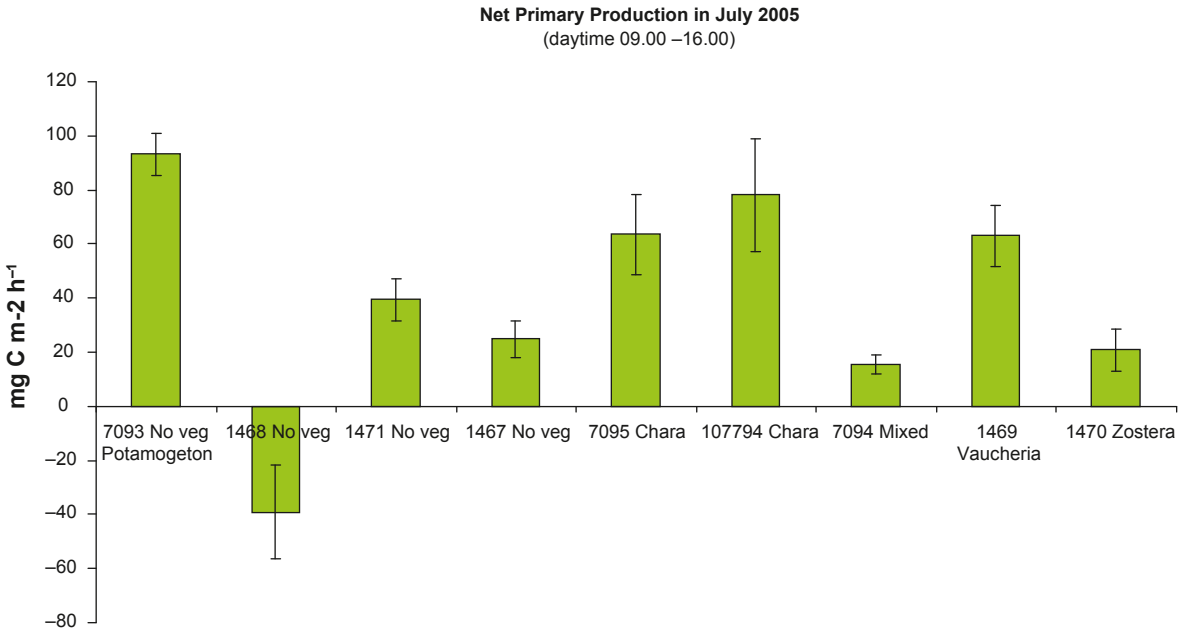

Figure 5-15. *Mean Net Primary Production in all sampled sites at the July sampling (N=5, error bars denote SEM).*

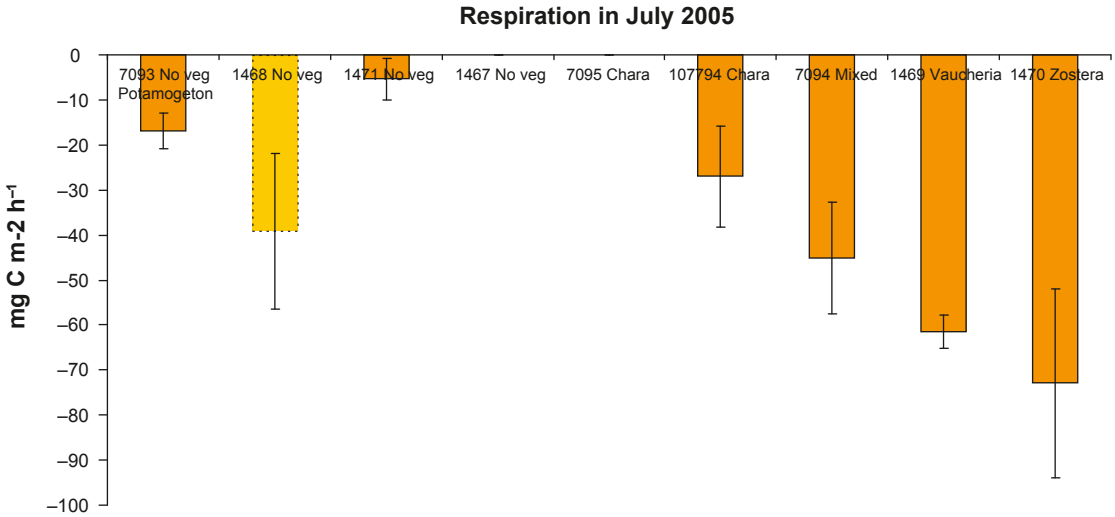

Figure 5-16. *Mean Respiration in all sampled sites at the July sampling (N=5, error bars denote SEM). The value for the lake site (PSM001468) is the measured NPP i.e. the minimum value for respiration.*

The *Zostera marina* site had a low net production, but a high respiration compared to other sites (72.9 mg C m^{-2} h^{-1}), i.e. a large gross primary production. The lake site (Frisksjön, PSM001468) had negative NPP.

Respiration varied more than an order of magnitude between the sites, from 5.3 to 72.9 mg C m^{-2} h^{-1}, and was higher in those communities with macrophytes than those without.

5.6 Net ecosystem production

The calculated annual net ecosystem production was positive in the three sites, resulting in a production of 28.3, 15.7 and 20.9 g C m^{-2} for the three sites, respectively. In the no vegetation/ *Potamogeton*-site (PSM007093) there was a positive NEP during June to September (Figure 5-17) and during March and April, in May and February NEP was close to 0 and only in the November and December the NEP was clearly negative. There was a positive NEP also when there was no macrophyte biomass.

In the mixed vegetation site (PSM007094), the warm summer months resulted in a negative NEP (see Figure 5-18), and the positive accumulated NEP was a result from positive NEP in winter and spring. This reflects the higher primary production during winter/spring due to the lack of ice coverage. In the *Chara*-community (Figure 5-19) it is clear that most carbon is assimilated in May to October and, although there is a lower respiration, the cool and darker November–April results in very little gross production, resulting in a net respiring community during these months.

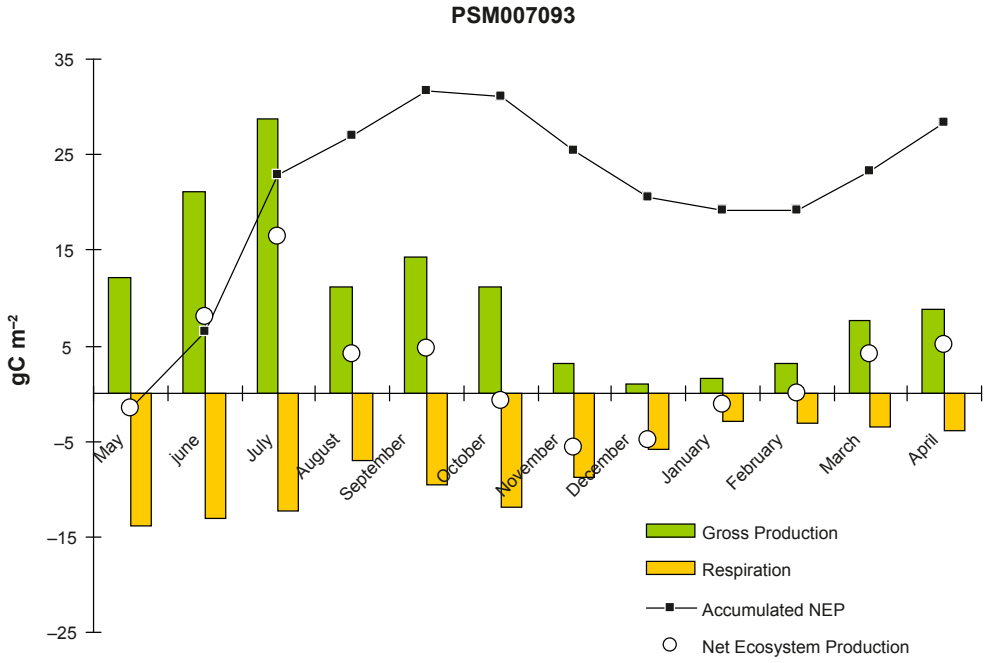

Figure 5-17. *Monthly gross production, respiration, net ecosystem production and accumulated net ecosystem production in the P. Pectinatus site (PSM007093). Accumulated NEP is calculated by summing each month, in May being equal to NEP value and in December being equal to annual NEP.*

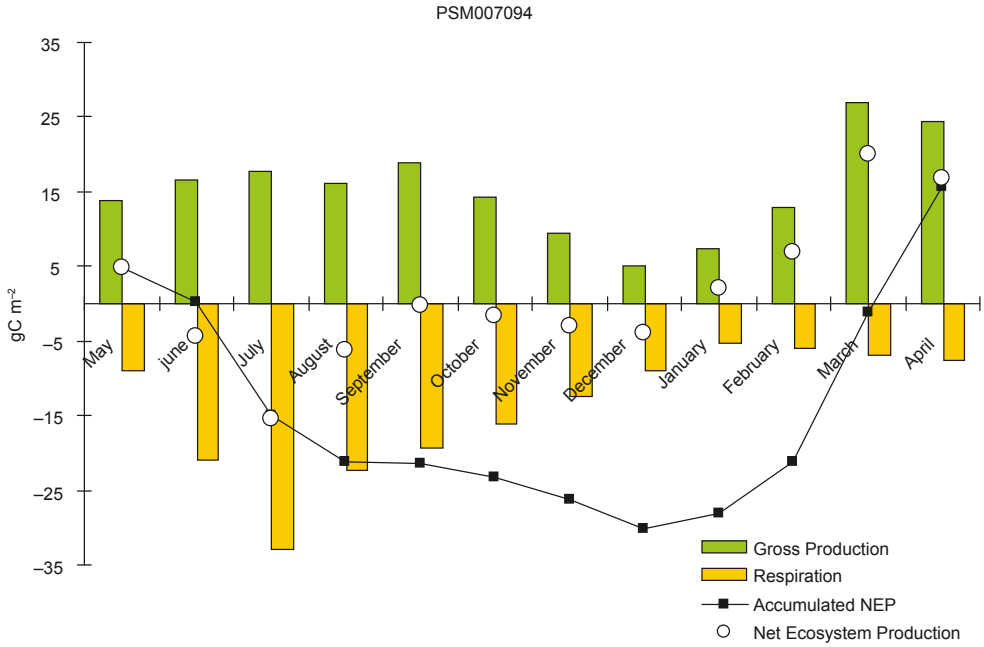

Figure 5-18. *Monthly gross production, respiration, net ecosystem production and accumulated net ecosystem production in the mixed vegetation site (PSM007094). Accumulated NEP is calculated by summing each month, in May being equal to NEP value and in December being equal to annual NEP.*

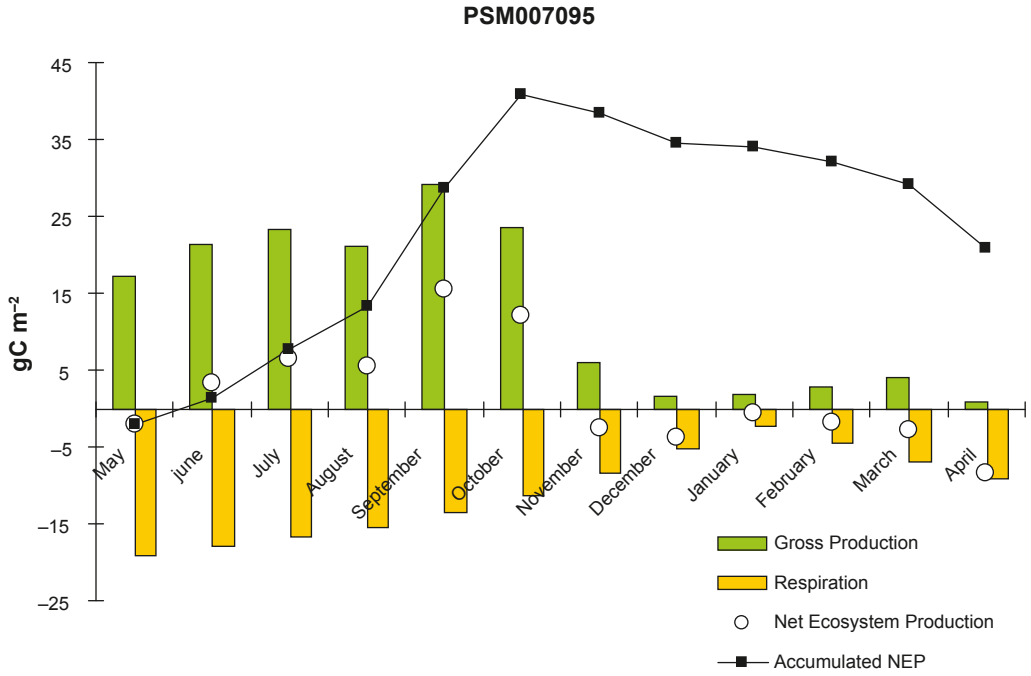

Figure 5-19. *Monthly gross production, respiration, net ecosystem production and accumulated net ecosystem production in the Chara spp. site (PSM007095). Accumulated NEP is calculated by summing each month, in May being equal to NEP value and in December being equal to annual NEP.*

6 Summary and discussions

The primary aim of this study was to quantify primary production and respiration in the benthic vegetation communities. The result show large variations over the year in accordance with variations of temperature and irradiance. There is also a large variation between the sites; net primary production, respiration and biomass varied approximately one order of magnitude between sites at the July sampling.

Three sites were studied during a period of one year, from May 2005 to April 2006. Over this period, biomass varied least in the site with a mix of macro algae and vascular plants (PSM007094), probably as the different plant species have different seasonality. The *P. pectinatus* site (PSM007093) showed a seasonal pattern with an accumulating biomass during summer and autumn that died in winter. The *Chara spp.* site (PSM007095) had a comparably constant biomass over the period, except in May. The notably low biomass in May in that site is likely due to a rapid breakdown and transport of dead plants that occurred after ice break-up in April. The low (or actually negative) net production and low respiration in winter and April, indicate that the algae were of low quality (or even dead) at these occasions.

Interpolating production and respiration over a year results in a net production in the communities (including macrophytes, sediment (probably including microphytes) and a 30 cm water column) of between 15.7 and 28.3 gC m^{-2} $year^{-1}$. This is several times lower than the modelled values previously presented in /Lindborg et al. 2006/ (122 to 1,017 gCm^{-2} $year^{-1}$, see Table 6-1).

The deviation between the model and the results from this report may have several reasons, one or more of the following can account for the differences:

- The figures of specific production (P/B) values in the model were not applicable to the site studied here.
- Respiration was underestimated in the model as the figures for bacterial respiration were derived from generic Baltic data
- The enclosure of the community in chambers can have lead to unrealistic static environment, causing lower production due lack of nutrients or the creation of gradients in the water close to the macrophytes.
- The use of P/B rations in the model might not account for that a portion of the macrophytes biomass are shaded.
- The more than tenfold higher biomass in the model in site PSM007093 has lead to an overestimated NPP in this site.

Table 6-1. Comparison between modelled /Lindborg et al 2006/ and measured/calculated values of biomass, NEP and respiration for the three sites PSM007093-7095.

	PSM007093 P. pecinatus		PSM007094 Mixed vegetation		PSM007095 Chara spp.	
	Measured	Modelled	Measured	Modelled	Measured	Modelled
NEP (gC m^{-2} $year^{-1}$)	28.3	122.5	15.7	330.1	20.9	1,017.2
R (gC m^{-2} $year^{-1}$)	–95.7	–66.7	–167.8	–97.5	–131.2	–22.9
Biomass (gC m^{-2})	2.5	46.2	27.2	39.4	62.9	41.9
Depth (m)	2.0	1.5	2.0	1.8	1.5	1.3

In a study on *Chara sp*. the annual production estimated by /Karlsson and Andersson 2006/, Andersson pers. comm. was in the same order of magnitude as in this and thus indicates that deviations in this site is rather due to the modelling than the measurements in the present study.

The magnitude of the different possible reasons for the deviations described above has not yet been evaluated and is out of scope of this report. However, these issues will be discussed in coming site description of the marine ecosystem 2007/08 and will used to improve the modelling of the marine system in Laxemar.

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Appendix 1

Raw data from the in situ measurements

Appendix 1a. Raw data on temperature and oxygen from in situ measurements.

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007095	2005-05-19	1	Void	13:03		10.88	103.5	
PSM007095	2005-05-19		2	13:06		10.9	104.6	2.20
PSM007095	2005-05-19		3	13:07		10.72	102.8	2.20
PSM007095	2005-05-19		4	13:08		10.56	102	1.60
PSM007095	2005-05-19		5	13:10		10.83	104.5	2.20
PSM007095	2005-05-19	2	Void	20:17		11.25	108.6	
PSM007095	2005-05-19		2	20:20		12.9	126	2.20
PSM007095	2005-05-19		3	20:21		12.9	125.5	2.20
PSM007095	2005-05-19		4	20:22		12.54	125.1	1.60
PSM007095	2005-05-19		5	20:24		12.7	123.4	2.20
PSM007095	2005-05-20	3	Void	09:34		10.27	97.3	
PSM007095	2005-05-20		2	09:37		7.23	68.5	2.20
PSM007095	2005-05-20		3	09:39		7.09	67.2	2.20
PSM007095	2005-05-20		4	09:41		7.39	70	1.60
PSM007095	2005-05-20		5	09:40		7.58	71	2.20
PSM007093	2005-05-18	1	Void	06:51		12.3	110	
PSM007093	2005-05-18		1	06:51		12.3	107	1.50
PSM007093	2005-05-18		2	06:53		12.2	109	1.80
PSM007093	2005-05-18		3	06:56		11.9	107	1.30
PSM007093	2005-05-18		4	06:55		11.9	107	2.00
PSM007093	2005-05-18		5	06:57		12.1	108	2.00
PSM007093	2005-05-18	2	Void	16:43		12.3	113	
PSM007093	2005-05-18		1	16:45		13.33	120	1.50
PSM007093	2005-05-18		2	16:54		13.55	122	1.80
PSM007093	2005-05-18		3	16:50		11.9	108.8	1.30
PSM007093	2005-05-18		4	16:47		14.02		2.00
PSM007093	2005-05-18		5	16:52		12.96	118.6	2.00
PSM007093	2005-05-19	3	Void			12.79	112	
PSM007093	2005-05-19		1	08:55		10.49	91.8	1.50
PSM007093	2005-05-19		2	08:56		7.82	68/ 52!	1.80
PSM007093	2005-05-19		3					1.30
PSM007093	2005-05-19		4	08:58		8.4	71	2.00
PSM007093	2005-05-19		5	08:59		6.37	55.7	2.00
PSM007094	2005-05-18	1	Void	06:02	9.5	12.1	106	
PSM007094	2005-05-18		1	06:03		11.8	104	2
PSM007094	2005-05-18		2	06:06		11.9	105	1.8
PSM007094	2005-05-18		3	06:04		12	105	1.8
PSM007094	2005-05-18		4	06:04		11.9	104	1.8
PSM007094	2005-05-18		5	06:04		11.9	105	1.8
PSM007094	2005-05-18	2	Void	08:30	9.7	13.4	106	
PSM007094	2005-05-18		1	08:43		14	112	2
PSM007094	2005-05-18		2	08:44		13.1	104	1.8
PSM007094	2005-05-18		3	08:47		13.1	105	1.8

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007094	2005-05-18		4	08:48		12.8	102	1.8
PSM007094	2005-05-18		5	08:49		12.4	100	1.8
PSM007094	2005-05-18	3	Void	15:20	10.7	12.52	112.3	
PSM007094	2005-05-18		1	15:12		15.35		2
PSM007094	2005-05-18		2	15:15		13.89	124.6	1.8
PSM007094	2005-05-18		3	15:17		14.76	134	1.8
PSM007094	2005-05-18		4	15:18		11.11	100.6	1.8
PSM007094	2005-05-18		5	15:19		12.68	115.4	1.8
PSM007094	2005-05-19	4	Void	07:32	8.6	12.72	108	
PSM007094	2005-05-19		1	07:34		12.16	105.3	2
PSM007094	2005-05-19		2	07:36		7.63	66	1.8
PSM007094	2005-05-19		3	07:37		10.5	90	1.8
PSM007094	2005-05-19		4	07:40		8.72	75.2	1.8
PSM007094	2005-05-19		5	07:42		11.32	98.2	1.8
PSM007094	2005-05-19	5	Void	21:08	9.2	13.43	116	
PSM007094	2005-05-19		1	21:09		18.65	160.9	2
PSM007094	2005-05-19		2	21:10		14.69	128.6	1.8
PSM007094	2005-05-19		3	21:11		17.42	153.5	1.8
PSM007094	2005-05-19		4	21:12		9.2	83	1.8
PSM007094	2005-05-19		5	21:13		14.02	122.6	1.8
PSM001468	2005-07-13	1	Void (nere)	09:10		1.25	12.3	
PSM001468	2005-07-13		Void (uppe)	08:45		8.65	102.4	
PSM001468	2005-07-13		1	08:52		5.54	73.6	
PSM001468	2005-07-13		2	08:55		8.41	83.3	
PSM001468	2005-07-13		3	08:59		9.64	89.9	
PSM001468	2005-07-13		4	09:04		2.5	18.5	
PSM001468	2005-07-13		5	09:06		1.43	13.9	
PSM001468	2005-07-13	2	Void (nere)	16:16		0.71	6.7	
PSM001468	2005-07-13		Void (uppe)	16:15		5.98	47.4	
PSM001468	2005-07-13		1	16:17		4.11	44.7	
PSM001468	2005-07-13		2	16:18		1.52	17.5	
PSM001468	2005-07-13		3	16:19		1.3	12.8	
PSM001468	2005-07-13		4	16:20		1.33	11.5	
PSM001468	2005-07-13		5	16:23		0.84	8.4	
PSM001468	2005-07-13	3	Void (nere)	19:38		0.48	5.9	
PSM001468	2005-07-13		Void (uppe)	19:45	24.3	6.45	62.1	
PSM001468	2005-07-13		1	19:46	21.6	3.65	38.1	
PSM001468	2005-07-13		2	19:50		2.06	21.5	
PSM001468	2005-07-13		3	19:51		1.34	13.5	
PSM001468	2005-07-13		4	19:53		1.02	10.9	
PSM001468	2005-07-13		5	19:55		0.76	7.7	
PSM001470	2005-07-14	1	Void	15:01	17.9	11.5	119.2	3
PSM001470	2005-07-14		Kontroll	15:03	17.9	11.3	116	3
PSM001470	2005-07-14		1	15:04		11.29	115.6	3
PSM001470	2005-07-14		2	15:05		11.53	117.3	3
PSM001470	2005-07-14		3	15:07		11.41	115.5	3
PSM001470	2005-07-14		4	15:08		11.5	117.6	3
PSM001470	2005-07-14		5	15:10		11.61	119	3

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM001470	2005-07-14	2	Void	18:33		11.4	122	3
PSM001470	2005-07-14		Kontroll	18:33		11.2	120	3
PSM001470	2005-07-14		1	18:34		11.5	120	3
PSM001470	2005-07-14		2	18:35		11.4	119	3
PSM001470	2005-07-14		3	18:36		12.3	128	3
PSM001470	2005-07-14		4	18:37		13.1	137	3
PSM001470	2005-07-14		5	18:38		12.6	133	3
PSM001470	2005-07-15	3	Void	07:34	18.4	10.1	108	3
PSM001470	2005-07-15		Kontroll	07:34	17.7	11.2	115	3
PSM001470	2005-07-15		1	07:36		9.4	97	3
PSM001470	2005-07-15		2	07:39		10.3	107	3
PSM001470	2005-07-15		3	07:42		7.7	79	3
PSM001470	2005-07-15		4	07:43		5.3	53	3
PSM001470	2005-07-15		5	07:45		6	61	3
PSM007093	2005-07-13	1	Void	08:35	23.6	10.5	123.8	
PSM007093	2005-07-13		1	08:42	23.7	10.5	124.6	
PSM007093	2005-07-13		2	08:40	23.7	10.6	125.1	
PSM007093	2005-07-13		3	08:39	23.7	10.4	122.6	
PSM007093	2005-07-13		4	08:37	23.7	10.3	122.2	
PSM007093	2005-07-13		5	08:36	24.2	9.3	111	
PSM007093	2005-07-13	2	Void	11:10	23.2	11.2	130.9	
PSM007093	2005-07-13		1	11:21	23.7	13	153.9	
PSM007093	2005-07-13		2	11:19	23.8	12.8	152.2	
PSM007093	2005-07-13		3	11:17	23.7	12.5	148.1	
PSM007093	2005-07-13		4	11:15	23.9	13.7	162.8	
PSM007093	2005-07-13		5	11:13	23.7	13.4	158.5	
PSM007093	2005-07-13	3	Void	12:47	23.8	11.3	134.1	
PSM007093	2005-07-13		1	12:57	24.1	14.9	178.4	
PSM007093	2005-07-13		2	12:55	24.1	14.8	176	
PSM007093	2005-07-13		3	12:53	24	14	166.6	
PSM007093	2005-07-13		4	12:51	24	16.4	195.5	
PSM007093	2005-07-13		5	12:49	24.1	15.5	185.2	
PSM007093	2005-07-13	4	Void	15:02	24.3	11.6	139.1	
PSM007093	2005-07-13		1	15:11	23.4	12.8	152.3	
PSM007093	2005-07-13		2	15:09	23.5	12.8	151.7	
PSM007093	2005-07-13		3	15:06	23.5	13.1	154.7	
PSM007093	2005-07-13		4	15:05	23.6	12.9	153	
PSM007093	2005-07-13		5	15:03	23.6	12.7	150.7	
PSM007093	2005-07-13	5	Void	16:29	24	12.8	152.5	
PSM007093	2005-07-13		1	16:38	23.7	14.3	170.1	0.25
PSM007093	2005-07-13		2	16:36	23.7	14.5	172.6	0.25
PSM007093	2005-07-13		3	16:34	23.7	14	166.1	0.25
PSM007093	2005-07-13		4	16:32	23.7	15.1	179.1	0.25
PSM007093	2005-07-13		5	16:30	23.8	14.5	172.6	0.25
PSM007093	2005-07-13	6	Void	19:24	23.4	12.3	144.8	
PSM007093	2005-07-13		1	19:37	23.3	13.9	163.9	
PSM007093	2005-07-13		2	19:35	23.3	13.5	159	
PSM007093	2005-07-13		3	19:32	23.2	13.8	162	
PSM007093	2005-07-13		4	19:29	23.1	14.4	164.9	

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007093	2005-07-13		5	19:28	23.2	13.6	160.5	
PSM001471	2005-07-25	1	Void	08:55	20.5	8.04	90.7	
PSM001471	2005-07-25		Kontroll	08:57	20.5	8.21	92.6	
PSM001471	2005-07-25		1	09:00	20.6	8.19	93	0.25
PSM001471	2005-07-25		2	09:02	20.6	8.05	91.3	0.25
PSM001471	2005-07-25		3	09:04	20.7	7.56	86.2	0.2
PSM001471	2005-07-25		4	09:06	20.6	8.24	93.4	0.2
PSM001471	2005-07-25		5	09:08	20.5	8.08	92	0.2
PSM001471	2005-07-25	2	Void	11:10	22.1	8.64	100.9	
PSM001471	2005-07-25		Kontroll	11:12	21.4	8.41	96.4	
PSM001471	2005-07-25		1	11:14	21.6	9.98	115.3	0.25
PSM001471	2005-07-25		2	11:16	22	9.04	104.1	0.25
PSM001471	2005-07-25		3	11:18	22	8.08	93.2	0.2
PSM001471	2005-07-25		4	11:20	22	9.78	113	0.2
PSM001471	2005-07-25		5	11:22	21.7	9.61	111.5	0.2
PSM001471	2005-07-25	3	Void	13:50	22	9.81	118.2	
PSM001471	2005-07-25		Kontroll	13:52	22	8.42	97.6	
PSM001471	2005-07-25		1	13:55	22.2	9.96	115.7	0.25
PSM001471	2005-07-25		2	13:57	22.2	9.03	104.5	0.25
PSM001471	2005-07-25		3	14:00	22	7.96	92.7	0.2
PSM001471	2005-07-25		4	14:03	22	9.81	113.9	0.2
PSM001471	2005-07-25		5	14:06	22.1	8.57	99.6	0.2
PSM007095	2005-07-12	1	Void	08:30	25.7	12.56	151.9	
PSM007095	2005-07-12		1	08:15	26	8.5	110.7	2
PSM007095	2005-07-12		2	08:22	25.6	10.91	130.6	2
PSM007095	2005-07-12		3	08:24	25.7	11.22	127.1	2
PSM007095	2005-07-12		4	08:26	25.6	12.2	142.2	2
PSM007095	2005-07-12		5	08:27	25.6	12.21	145.1	2
PSM007095	2005-07-12	2	Void	10:15	25.9	13.01	160.4	
PSM007095	2005-07-12		1	10:12	26.1	11.63	146.5	2
PSM007095	2005-07-12		2	10:16	26	12.38	142.9	2
PSM007095	2005-07-12		3	10:18	26	12.65	166.2	2
PSM007095	2005-07-12		4	10:20	25.9	13.29	162.8	2
PSM007095	2005-07-12		5	10:21	25.8	12.43	161.9	2
PSM007095	2005-07-12	3	Void	14:33	27.4	13.22	165.4	
PSM007095	2005-07-12		1	14:23	27.3	17.4	218	2
PSM007095	2005-07-12		2	14:26	26.7	12.9	161.3	2
PSM007095	2005-07-12		3	14:28	27.1	17.01	225	2
PSM007095	2005-07-12		4	14:30	27.2	19.5	240	2
PSM007095	2005-07-12		5	14:31	26.8	16.8	208	2
PSM007095	2005-07-12	4	Void	14:52	27.6	14.12	178.6	
PSM007095	2005-07-12		1	14:43	27.6	13.4	168.3	2
PSM007095	2005-07-12		2	14:45	27.4	13.14	163	2
PSM007095	2005-07-12		3	14:47	27.5	14.74	182.8	2
PSM007095	2005-07-12		4	14:48	27.5	13.58	172.9	2
PSM007095	2005-07-12		5	14:50	27.5	14.36	178.8	2
PSM007095	2005-07-12	5	Void	16:22	27.9	20.3	264	
PSM007095	2005-07-12		1	16:15	27.8	19.82	253	2
PSM007095	2005-07-12		2	16:17	27.7	19.12	244	2

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007095	2005-07-12		3	16:19	27.9	22	273	2
PSM007095	2005-07-12		4	16:20	27.9	21.6	270	2
PSM007095	2005-07-12		5	16:21	27.6	21.3	266	2
PSM007095	2005-07-12	6	Void	19:45	27.9	8.82	107.8	
PSM007095	2005-07-12		1	19:41	28	13.14	159.2	2
PSM007095	2005-07-12		2	19:47	27.6	7.53	90.7	2
PSM007095	2005-07-12		3	19:49	27.9	7.39	91	2
PSM007095	2005-07-12		4	19:51	27.9	6.46	77.5	2
PSM007095	2005-07-12		5	19:53	27.8	5.8	70.8	2
PSM107794	2005-07-19	1	Void	09:04	22.4	9.54	111.9	
PSM107794	2005-07-19		Kontroll	09:07	22.4	9.36	109.3	1.5
PSM107794	2005-07-19		1	09:10	22.5	9.87	114.4	1.5
PSM107794	2005-07-19		2	09:12	22.5	9.69	113.1	1.5
PSM107794	2005-07-19		3	09:16	22.7	10.8	127.2	1.5
PSM107794	2005-07-19		4	09:18	22.7	10.2	120.3	1.5
PSM107794	2005-07-19		5	09:20	22.8	10.8	127.7	1.5
PSM107794	2005-07-19	2	Void	10:45	23.4	10.8	128.3	
PSM107794	2005-07-19		Kontroll	10:47	23.4	9.91	118.2	1.5
PSM107794	2005-07-19		1	10:52	24.2	12.6	152.9	1.5
PSM107794	2005-07-19		2	10:55	23.8	12.2	145.7	1.5
PSM107794	2005-07-19		3	11:00	23.7	16.2	194.1	1.5
PSM107794	2005-07-19		4	11:03	24.1	13.5	163.8	1.5
PSM107794	2005-07-19		5	11:05	24.1	13.7	165.7	1.5
PSM107794	2005-07-19	3	Void	14:23	24.3	11.8	141.7	
PSM107794	2005-07-19		Kontroll	14:25	24.5	9.83	119.2	1.5
PSM107794	2005-07-19		1	14:28	24	10.9	132.9	1.5
PSM107794	2005-07-19		2	14:30	24	11.3	136.6	1.5
PSM107794	2005-07-19		3	14:32	24.2	11.2	134.7	1.5
PSM107794	2005-07-19		4	14:34	24	11	131	1.5
PSM107794	2005-07-19		5	14:36	24.4	11.5	139.9	1.5
PSM007094	2005-07-11	1	Void	07:31	23.6	8.68	101	
PSM007094	2005-07-11		1	07:32	23.6	7.7	87	2.3
PSM007094	2005-07-11		2	07:33	23.6	8.52	97.4	2.5
PSM007094	2005-07-11		3	07:34	23.6	8.55	97.2	2.3
PSM007094	2005-07-11		4	07:35	23.6	8.54	96.6	2.4
PSM007094	2005-07-11		5	07:36	23.6	8.46	95.7	2.3
PSM007094	2005-07-11	2	Void	08:53	23.8	9.22	107	
PSM007094	2005-07-11		1	08:54	23.8	7.54	87.8	2.3
PSM007094	2005-07-11		2	08:55	23.8	7.86	90	2.5
PSM007094	2005-07-11		3	08:56	23.8	8.11	94	2.3
PSM007094	2005-07-11		4	08:57	23.8	8.92	104	2.4
PSM007094	2005-07-11		5	08:58	23.8	8.7	101	2.3
PSM007094	2005-07-11	3	Void	11:50	24.1	9.61	112.1	
PSM007094	2005-07-11		1	11:50	24.1	8.31	96.5	2.3
PSM007094	2005-07-11		2	11:51	24.1	8.9	103.5	2.5
PSM007094	2005-07-11		3	11:44	24.1	8.05	93.2	2.3
PSM007094	2005-07-11		4	11:45	24.1	10.25	119.4	2.4
PSM007094	2005-07-11		5	11:53	24.1	9.24	107.7	2.3
PSM007094	2005-07-11	4	Void	13:50	24.9	8.93	106.9	

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007094	2005-07-11		1	13:52	24.5	8.65	103	2.3
PSM007094	2005-07-11		2	13:54	24.6	9.25	108.4	2.5
PSM007094	2005-07-11		3	13:56	24.5	8.03	93.7	2.3
PSM007094	2005-07-11		4	13:58	24.5	11.02	131.5	2.4
PSM007094	2005-07-11		5	14:00	24.6	9.59	113	2.3
PSM007094	2005-07-11		4*	14:25	24.8	8.91	106.7	
PSM007094	2005-07-11	5	Void					
PSM007094	2005-07-11		1	17:40	24.9	10.6	118.3	2.3
PSM007094	2005-07-11		2	17:45	24.6	11.3	130.4	2.5
PSM007094	2005-07-11		3	17:50	24.9	9.81	111.1	2.3
PSM007094	2005-07-11		4	17:52	25	11.8	132.8	2.4
PSM007094	2005-07-11		5	17:56	24.9	11.51	136.6	2.3
PSM007094	2005-07-11	6	Void	22:17	25	6.8	100.2	
PSM007094	2005-07-11		1	22:19	25	8.6	80	2.3
PSM007094	2005-07-11		2	22:21	25.3	7.22	102.1	2.5
PSM007094	2005-07-11		3	22:22	24.9	9.49	80	2.3
PSM007094	2005-07-11		4	22:23	25.1	7.52	112	2.4
PSM007094	2005-07-11		5	22:24	25	8.42	90	2.3
PSM001467	2005-07-12	1	Void (grund)	09:06	20	11.02	123.8	
PSM001467	2005-07-12		Void (djup)	09:13	16.6	7.78	78.4	
PSM001467	2005-07-12		1	09:06	20	10.1	110.4	0.29
PSM001467	2005-07-12		2	09:07	18.6	9.6	104.8	0.29
PSM001467	2005-07-12		3	09:09	18	9.12	96	0.28
PSM001467	2005-07-12		4	09:11	17.2	8.24	86.2	0.27
PSM001467	2005-07-12		5	09:12	16.2	7.73	79.1	0.27
PSM001467	2005-07-12	2	Void (grund)	10:58		11.3	125.4	
PSM001467	2005-07-12		Void (djup)	11:05		8.89	89.7	
PSM001467	2005-07-12		1	10:59		10.04	110.2	0.29
PSM001467	2005-07-12		2	11:01		10.3	111.2	0.29
PSM001467	2005-07-12		3	11:02		8.94	93.3	0.28
PSM001467	2005-07-12		4	11:03		8.47	87.8	0.27
PSM001467	2005-07-12		5	11:04		8.65	87.4	0.27
PSM001467	2005-07-12	3	Void (grund)	15:26	20.7	9.8	106.5	
PSM001467	2005-07-12		Void (djup)	15:38	16.2	6.04	59.6	
PSM001467	2005-07-12		1	15:28	19.9	7.38	76.2	0.29
PSM001467	2005-07-12		2	15:30	19	7.71	81	0.29
PSM001467	2005-07-12		3	15:32	18.2	6.11	62.3	0.28
PSM001467	2005-07-12		4	15:34	17.5	5.6	55.4	0.27
PSM001467	2005-07-12		5	15:36	16.7	6.56	64.2	0.27
PSM001467	2005-07-12	4	Void (grund)	16:50	21.8	9.63	106.1	
PSM001467	2005-07-12		Void (djup)	17:04	17	6.79	68.1	
PSM001467	2005-07-12		1	16:53	20.9	7.85	85.5	0.29
PSM001467	2005-07-12		2	16:56	20	7.99	86	0.29
PSM001467	2005-07-12		3	16:58	19	7.02	72.3	0.28
PSM001467	2005-07-12		4	17:00	17.4	6.45	66	0.27
PSM001467	2005-07-12		5	17:02	16.8	6.94	68.4	0.27
PSM001467	2005-07-12	5	Void (grund)	19:08	22.2	10.18	116.6	
PSM001467	2005-07-12		Void (djup)	19:20	16.6	7.72	75.9	
PSM001467	2005-07-12		1	19:09	21.1	7.75	84.1	0.29

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM001467	2005-07-12		2	19:11	19.9	7.81	85.5	0.29
PSM001467	2005-07-12		3	19:13	18.3	6.75	68.5	0.28
PSM001467	2005-07-12		4	19:15	16.9	6.53	65.1	0.27
PSM001467	2005-07-12		5	19:17	16.2	7.32	73.6	0.27
PSM001469	2005-07-14	1	Void	08:25	24.4	9.06	104.4	
PSM001469	2005-07-14		Kontroll	08:27	24.4	8.75	102.5	3
PSM001469	2005-07-14		1	08:29		8.62	99.9	1.5
PSM001469	2005-07-14		2	08:31		9.22	108	1.5
PSM001469	2005-07-14		3	08:32		8.78	103.2	1.5
PSM001469	2005-07-14		4	08:34		9.35	109.5	1.5
PSM001469	2005-07-14		5	08:35		8.88	103.5	1.5
PSM001469	2005-07-14	2	Void	08:56	24.6	8.93	107.4	
PSM001469	2005-07-14		Kontroll	08:58	24.6	8.84	106.4	3
PSM001469	2005-07-14		1	08:59	24.6	9.24	111.3	1.5
PSM001469	2005-07-14		2	09:01	24.7	9.77	117.8	1.5
PSM001469	2005-07-14		3	09:02	24.7	9.3	112.2	1.5
PSM001469	2005-07-14		4	09:04	24.8	9.93	120	1.5
PSM001469	2005-07-14		5	09:04	24.5	9.35	112.7	1.5
PSM001469	2005-07-14	3	Void	10:58	24.7	9.37	113	
PSM001469	2005-07-14		Kontroll	11:00	24.9	8.91	107.9	3
PSM001469	2005-07-14		1	11:02	25.5	12.3	150.2	1.5
PSM001469	2005-07-14		2	11:08	25.5	15	183.9	1.5
PSM001469	2005-07-14		3	11:17		13.1	162	1.5
PSM001469	2005-07-14		4	11:20		12.5	153.4	1.5
PSM001469	2005-07-14		5	11:24		12.3	151.8	1.5
PSM001469	2005-07-14	4	Void	12:05	24.8	9.53	115.9	
PSM001469	2005-07-14		Kontroll	12:07	24.8	9.52	115.8	3
PSM001469	2005-07-14		1	12:09	24.9	10	122.3	1.5
PSM001469	2005-07-14		2	12:10	24.9	9.8	119.2	1.5
PSM001469	2005-07-14		3	12:11	25	9.73	118.6	1.5
PSM001469	2005-07-14		4	12:11	25.1	9.96	121.6	1.5
PSM001469	2005-07-14		5	12:13	24.9	9.87	120.1	1.5
PSM001469	2005-07-14	5	Void	14:44	25	9.62	116.7	
PSM001469	2005-07-14		Kontroll	14:46	25.3	9.56	116.7	3
PSM001469	2005-07-14		1	14:48	25.7	13.8	170.3	1.5
PSM001469	2005-07-14		2	14:52	25.7	16.7	200	1.5
PSM001469	2005-07-14		3	14:57	26.2	17.7	200	1.5
PSM001469	2005-07-14		4	15:01	26	16.3	200	1.5
PSM001469	2005-07-14		5	15:04	25.9	15	185.4	1.5
PSM001469	2005-07-14	6	Void	15:18	25	9.57	116	
PSM001469	2005-07-14		Kontroll	15:20	25	9.73	118	3
PSM001469	2005-07-14		1	15:22	24.8	9.73	117.7	1.5
PSM001469	2005-07-14		2	15:24	24.8	10.1	122.4	1.5
PSM001469	2005-07-14		3	15:27	24.9	9.64	117.1	1.5
PSM001469	2005-07-14		4	15:29	25	9.77	118.7	1.5
PSM001469	2005-07-14		5	15:31	25	9.81	119	1.5
PSM001469	2005-07-14	7	Void	17:16	25	9.72	118.2	
PSM001469	2005-07-14		Kontroll	17:18	25.2	9.78	119.3	3
PSM001469	2005-07-14		1	17:20	25.4	11.9	146	1.5

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM001469	2005-07-14		2	17:22	25.3	12	146.8	1.5
PSM001469	2005-07-14		3	17:27	25.5	13.4	164.1	1.5
PSM001469	2005-07-14		4	17:32	25.6	13.7	168.7	1.5
PSM001469	2005-07-14		5	17:35	25.5	13.8	169.4	1.5
PSM001469	2005-07-14	8	Void	21:24	24.6	9.2	110.6	
PSM001469	2005-07-14		Kontroll	21:25	24.9	9.69	117.2	3
PSM001469	2005-07-14		1	21:29	25	5.83	70.7	1.5
PSM001469	2005-07-14		2	21:34	25.1	6.65	80.7	1.5
PSM001469	2005-07-14		3	21:37	24.9	8.39	101.5	1.5
PSM001469	2005-07-14		4	21:45	25.2	0.57	6.9	1.5
PSM001469	2005-07-14		5	21:51	25.2	0.4	4.9	1.5
PSM001469	2005-07-27		Void	09:09	20.1	9.19	102.2	
PSM001469	2005-07-27		Kontroll	09:11	20	9.24	103	1.5
PSM001469	2005-07-27		1	09:13	20	9.28	103.6	1.5
PSM001469	2005-07-27		2	09:14	20	9.26	103.5	1.5
PSM001469	2005-07-27		3	09:15	20	9.31	103.7	1.5
PSM001469	2005-07-27		4	09:17	20.2	9.25	102.8	1.5
PSM001469	2005-07-27		5	09:19	20	9.2	102.3	1.5
PSM001469	2005-07-27		Void	10:44	20.1	9.59	106.6	
PSM001469	2005-07-27		Kontroll	10:47	20	9.39	105.5	1.5
PSM001469	2005-07-27		1	10:49	20.6	9.63	108	1.5
PSM001469	2005-07-27		2	10:51	20.5	9.64	107.8	1.5
PSM001469	2005-07-27		3	10:53	20.3	9.86	110.4	1.5
PSM001469	2005-07-27		4	10:55	20.3	9.55	106.7	1.5
PSM001469	2005-07-27		5	10:58	20	9.65	107.7	1.5
PSM001469	2005-07-27		Void	13:38	20.9	9.99	112.2	
PSM001469	2005-07-27		Kontroll	13:40	21.5	9.22	105.3	1.5
PSM001469	2005-07-27		1	13:42	20.5	9.83	109.9	1.5
PSM001469	2005-07-27		2	13:45	20.5	9.82	109.9	1.5
PSM001469	2005-07-27		3	13:48	20.6	9.74	108.7	1.5
PSM001469	2005-07-27		4	13:49	20.6	9.74	108.6	1.5
PSM001469	2005-07-27		5	13:50	20.6	9.7	108.2	1.5
PSM001470	2005-08-17	1	void	15:36	16.1	11.2	112	
PSM001470	2005-08-17		1	15:40	16.1	7.91	79.1	2.5
PSM001470	2005-08-17		2	15:43	16.1	8.31	82.9	2.5
PSM001470	2005-08-17		3	15:45	16.1	7.65	76.4	2.5
PSM001470	2005-08-17		4	15:50	16	7.52	75.1	2.5
PSM001470	2005-08-17		5	15:53	16.1	7.9	78.6	2.5
PSM001470	2005-08-17		kontroll	15:58	16.1	7.87	78.7	2.5
PSM001470	2005-08-17	2	void	18:17	16	10.07	100	
PSM001470	2005-08-17		1	18:19	16	10.2	102	2.5
PSM001470	2005-08-17		2	18:21	16.1	11.4	114	2.5
PSM001470	2005-08-17		3	18:23	16.1	9.96	99.6	2.5
PSM001470	2005-08-17		4	18:25	16	11.64	114.7	
PSM001470	2005-08-17		5	18:26		12.31	124	
PSM001470	2005-08-17		kontroll	18:28		12.33	123	
PSM001470	2005-08-18	3	void	08:50	16.8	9.7	98.3	
PSM001470	2005-08-18		1	08:51	16.8	6.6	67	
PSM001470	2005-08-18		2	08:52	16.7	6.5	66	2.5

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM001470	2005-08-18		3	08:53	16.7	3.8	37.6	2.5
PSM001470	2005-08-18		4	08:55	16.7	7.3	73	2.5
PSM001470	2005-08-18		5					
PSM001470	2005-08-18		kontroll	08:58	16.6	9.7	97	
PSM001470	2005-08-18	4	void	10:46	17.1	10.7	109	
PSM001470	2005-08-18		1	10:47	16.8	7.7	77.5	2.5
PSM001470	2005-08-18		2	10:49	16.8	7.4	76	2.5
PSM001470	2005-08-18		3	10:50	16.8	5.7	58	2.5
PSM001470	2005-08-18		4	10:53	16.9	8.8	89	2.5
PSM001470	2005-08-18		5					
PSM001470	2005-08-18		kontroll	10:54	16.8	9.8	98	2.5
PSM001470	2005-08-18	5	void	16:28	17.2	12.2	123	
PSM001470	2005-08-18		1	16:29	17.2	13.3	134	2.5
PSM001470	2005-08-18		2	16:31	17.3	13.5	137	2.5
PSM001470	2005-08-18		3	16:34	17.3	12.2	124	2.5
PSM001470	2005-08-18		4	16:35	17.2	13.2	134	2.5
PSM001470	2005-08-18		5					
PSM001470	2005-08-18		kontroll	16:37	17.1	10.5	106	2.5
PSM001468	2005-07-13	1	Void (nere)	09:10		1.25	12.3	
PSM001468	2005-07-13		Void (uppe)	08:45		8.65	102.4	
PSM001468	2005-07-13		1	08:52		5.54	73.6	
PSM001468	2005-07-13		2	08:55		8.41	83.3	
PSM001468	2005-07-13		3	08:59		9.64	89.9	
PSM001468	2005-07-13		4	09:04		2.5	18.5	
PSM001468	2005-07-13		5	09:06		1.43	13.9	
PSM001468	2005-07-13	2	Void (nere)	16:16		0.71	6.7	
PSM001468	2005-07-13		Void (uppe)	16:15		5.98	47.4	
PSM001468	2005-07-13		1	16:17		4.11	44.7	
PSM001468	2005-07-13		2	16:18		1.52	17.5	
PSM001468	2005-07-13		3	16:19		1.3	12.8	
PSM001468	2005-07-13		4	16:20		1.33	11.5	
PSM001468	2005-07-13		5	16:23		0.84	8.4	
PSM001468	2005-07-13	3	Void (nere)	19:38		0.48	5.9	
PSM001468	2005-07-13		Void (uppe)	19:45	24.3	6.45	62.1	
PSM001468	2005-07-13		1	19:46	21.6	3.65	38.1	
PSM001468	2005-07-13		2	19:50		2.06	21.5	
PSM001468	2005-07-13		3	19:51		1.34	13.5	
PSM001468	2005-07-13		4	19:53		1.02	10.9	
PSM001468	2005-07-13		5	19:55		0.76	7.7	
PSM007095	2005-08-17	1	void	18:00	20.5	12.18	138.8	
PSM007095	2005-08-17		1	18:05	20.6	11.8	137	2.5
PSM007095	2005-08-17		2	18:07	20.7	11.97	133.2	2.5
PSM007095	2005-08-17		3	18:01	20.6	12.35	134.9	2.5
PSM007095	2005-08-17		4	18:12	20.7	11.12	124	2.5
PSM007095	2005-08-17		5	18:15	20.7	12.54	140.1	2.5
PSM007095	2005-08-17		kontroll	18:03	20.6	11.78	133.8	1.5
PSM007095	2005-08-18	2	void	08:47	19.7	11.31	123.4	
PSM007095	2005-08-18		1	09:01	19.8	9.11	103.3	2.5
PSM007095	2005-08-18		2	09:02	19.9	6.75	74.2	2.5

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007095	2005-08-18		3	09:05	19.9	9.18	104.6	2.5
PSM007095	2005-08-18		4	09:07	19.8	8.52	92	2.5
PSM007095	2005-08-18		5	09:09	19.8	5.83	61.7	2.5
PSM007095	2005-08-18		kontroll	08:59	19.8	11.09	121.8	1.5
PSM007095	2005-08-18	3	void	11:56	20.4	12.37	140	
PSM007095	2005-08-18		1	11:59	20.3	10.1	109	2.5
PSM007095	2005-08-18		2	12:00	20.3	9.3	102	2.5
PSM007095	2005-08-18		3	12:02	20.3	10.5	115	2.5
PSM007095	2005-08-18		4	12:04	20.3	7.9	86	2.5
PSM007095	2005-08-18		5	12:05	20.4	7.8	86	2.5
PSM007095	2005-08-18		kontroll	11:57	20	11.4	124	1.5
PSM007095	2005-08-18	4	void	14:55	20.8	19.4	216	
PSM007095	2005-08-18		1	14:58	20.9	16.46	181	2.5
PSM007095	2005-08-18		2	15:00	21	17.48	193.8	2.5
PSM007095	2005-08-18		3	15:01	21.1	18.22	203	2.5
PSM007095	2005-08-18		4	15:03	21.1	15.15	167.6	2.5
PSM007095	2005-08-18		5	15:05	21.2	18.56	206	2.5
PSM007095	2005-08-18		kontroll	14:57	20.8	14.93	165.2	1.5
PSM007093	2005-08-17	1	void	15:15	18.4	10.1	108	
PSM007093	2005-08-17		1	15:23	18.6	10.3	110	2.5
PSM007093	2005-08-17		2	15:21	18.3	10.3	109.7	2.5
PSM007093	2005-08-17		3	15:20	18.4	10.4	110.5	2.5
PSM007093	2005-08-17		4	15:19	18.5	10.6	112.6	2.5
PSM007093	2005-08-17		5	15:18	18.4	10.3	109.4	2.5
PSM007093	2005-08-17		Kontroll	15:16	18.6	10.2	108.7	3
PSM007093	2005-08-17	2	void	17:45	18.4	10.1	106.8	
PSM007093	2005-08-17		1	17:56	18.6	11.5	122.7	2.5
PSM007093	2005-08-17		2	17:55	18.4	11.1	117.4	2.5
PSM007093	2005-08-17		3	17:53	18.4	11.4	121.6	2.5
PSM007093	2005-08-17		4	17:50	18.5	11.6	123.6	2.5
PSM007093	2005-08-17		5	17:48	18.5	11.6	123.6	2.5
PSM007093	2005-08-17		Kontroll	17:46	18.6	10.1	107.5	3
PSM007093	2005-08-18	3	void	08:38		9.68	102.5	
PSM007093	2005-08-18		1	08:49	18.4	10.6	112.1	2.3
PSM007093	2005-08-18		2	08:47	18.4	10.6	112.1	2.3
PSM007093	2005-08-18		3	08:46	18.5	10.5	111	2.5
PSM007093	2005-08-18		4	08:43	18.4	8.77	92.9	2.4
PSM007093	2005-08-18		5	08:39	18.5	9.98	105.7	2.4
PSM007093	2005-08-18		Kontroll	-				3
PSM007093	2005-08-18	4	void	13:50	19.3	11.4	123.6	
PSM007093	2005-08-18		1	13:59	19.5	13.2	142.9	2.1
PSM007093	2005-08-18		2	13:57	19.4	11.6	125.3	2.1
PSM007093	2005-08-18		3	13:55	19.5	12.6	136.8	2.5
PSM007093	2005-08-18		4	13:53	19.4	12.7	138.1	2.3
PSM007093	2005-08-18		5	13:52	19.3	12.5	135.8	2.3
PSM007093	2005-08-18		Kontroll					3
PSM007093	2005-08-18	5	void	16:07	19.9	11.5	125.3	
PSM007093	2005-08-18		1	16:17	19.9	14.9	163.2	2.1
PSM007093	2005-08-18		2	16:15	19.8	12.8	139.1	2.1

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007093	2005-08-18		3	16:13	19.8	14.1	153.7	2.5
PSM007093	2005-08-18		4	16:12	19.8	14.3	155.7	2.3
PSM007093	2005-08-18		5	16:09	19.7	14.2	154	2.3
PSM007094	2005-08-16	1	void	22:11	19.3	10	108.5	
PSM007094	2005-08-16		1	22:13	19.4	9.69	105.3	2
PSM007094	2005-08-16		2	22:15	19.4	9.36	101.6	1.4
PSM007094	2005-08-16		3	22:16	19.4	9.63	104.5	0.9
PSM007094	2005-08-16		4	22:17	19.4	9.84	106.6	2.1
PSM007094	2005-08-16		5	22:18	19.4	9.72	105.5	1.5
PSM007094	2005-08-17	2	void	06:42	18.3	9.17	96.8	
PSM007094	2005-08-17		1	06:44	18.7	3.77	40.2	2
PSM007094	2005-08-17		2	06:46	18.8	3.47	37.1	1.4
PSM007094	2005-08-17		3	06:49	18.7	4.34	46.2	0.9
PSM007094	2005-08-17		4	06:52	18.8	4.96	53	2.1
PSM007094	2005-08-17		5	06:54	18.7	5.11	54.5	1.5
PSM007094	2005-08-17	3	void	09:51	17.9	9.58	108	
PSM007094	2005-08-17		1	09:53	18.7	6.37	68.1	2
PSM007094	2005-08-17		2	10:00	18.9	3.43	36.9	1.4
PSM007094	2005-08-17		3	10:02	18.8	4.07	43.6	0.9
PSM007094	2005-08-17		4	10:08	18.8	4.45	47.8	2.1
PSM007094	2005-08-17		5	10:01	18.7	6.96	74.6	1.5
PSM007094	2005-08-17	4	void	13:12	18.5	10.2	108.6	
PSM007094	2005-08-17		1	13:15	19.2	8.89	96.1	2
PSM007094	2005-08-17		2	13:17	19.2	5.33	57.7	1.4
PSM007094	2005-08-17		3	13:22	19.2	4.44	48.1	0.9
PSM007094	2005-08-17		4	13:24	19	5.49	59.3	2.1
PSM007094	2005-08-17		5	13:25	19	9.61	103.6	1.5
PSM007093	2005-10-18	1	void	10:12	7.2	11.3	92	
PSM007093	2005-10-18		1	10:14	7	11.3	91.2	2
PSM007093	2005-10-18		2	10:15	6.9	11.3	90.9	2.2
PSM007093	2005-10-18		3	10:15	6.9	11.3	91.2	2
PSM007093	2005-10-18		4	10:16	6.9	11.4	91.5	2
PSM007093	2005-10-18		5	10:16	6.9	11.4	91.7	2
PSM007093	2005-10-18		kontroll	10:13	7.1	11.2	90.4	3
PSM007093	2005-10-18	2	void	14:15	7.5	12.1	97.4	
PSM007093	2005-10-18		1	14:16	7.6	13.8	111.2	2
PSM007093	2005-10-18		2	14:18	7.9	16.4	133.4	2.2
PSM007093	2005-10-18		3	14:19	7.9	14	114.1	2
PSM007093	2005-10-18		4	14:20	8.1	15.1	123.3	2
PSM007093	2005-10-18		5	14:22	8	13.6	111.2	2
PSM007093	2005-10-18		kontroll	14:23	7.6	11.3	90.6	3
PSM007093	2005-10-18	3	void	17:13	7.4	11.6	97.1	
PSM007093	2005-10-18		1	17:15	7.9	14.9	126.7	2
PSM007093	2005-10-18		2	17:17	8.1	18.3	155.5	2.2
PSM007093	2005-10-18		3	17:18	8	15.2	129.6	2
PSM007093	2005-10-18		4	17:21	8.2	17.4	149.1	2
PSM007093	2005-10-18		5	17:22	8	14.7	124.8	2
PSM007093	2005-10-18		kontroll	17:24	7.7	11.6	98	3
PSM007093	2005-10-19	4	void	07:28	6.6	11.7	94.9	

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007093	2005-10-19		1	07:30	7	12.1	98	2
PSM007093	2005-10-19		2	07:31	7	12.9	106.3	2.2
PSM007093	2005-10-19		3	07:31	7.1	12.4	102.3	2
PSM007093	2005-10-19		4	07:34	7	12.9	106.7	2
PSM007093	2005-10-19		5	07:35	6.9	12.2	100.2	2
PSM007093	2005-10-19		kontroll	07:36	6.9	11.4	93.9	3
PSM007093	2005-10-19	5	void	13:30	7	12.1	99.4	
PSM007093	2005-10-19		1	13:34	7.3	14.3	117.5	2
PSM007093	2005-10-19		2	13:36	7.3	17.1	140.9	2.2
PSM007093	2005-10-19		3	13:38	7.4	14.5	119.6	2
PSM007093	2005-10-19		4	13:40	7.5	15.9	131.6	2
PSM007093	2005-10-19		5	13:42	7.1	14.1	116.1	2
PSM007093	2005-10-19		kontroll	13:44	7.2	11.4	93	3
PSM007095	2005-10-17	1	void	09:08	8.5	10	83.6	
PSM007095	2005-10-17		1	09:10	8.6	10	83.8	2.8
PSM007095	2005-10-17		2	09:11	8.7	9.8	83.8	2.8
PSM007095	2005-10-17		3	09:12	8.9	9.8	82.8	2.8
PSM007095	2005-10-17		4	09:14	8.9	9.8	82.7	2.8
PSM007095	2005-10-17		5	09:15	8.8	9.8	82.7	2.8
PSM007095	2005-10-17		kontroll	09:15	8.7	10	83.5	3
PSM007095	2005-10-17	2	void	14:10	8.9	10.8	91.6	
PSM007095	2005-10-17		1	14:11	9.1	11.3	95.4	2.8
PSM007095	2005-10-17		2	14:11	9	11.7	99.3	2.8
PSM007095	2005-10-17		3	14:13	9.1	11	93.8	2.8
PSM007095	2005-10-17		4	14:14	9.2	12	101.7	2.8
PSM007095	2005-10-17		5	14:16	9.2	11.8	100.3	2.8
PSM007095	2005-10-17		kontroll	14:17	9.1	10	85.1	3
PSM007095	2005-10-17	3	void	17:29	8.7	11.3	95.1	2.8
PSM007095	2005-10-17		1	17:30	9.1	12.1	102.5	2.8
PSM007095	2005-10-17		2	17:32	9.3	12.4	106	2.8
PSM007095	2005-10-17		3	17:33	9.2	11.6	97.7	2.8
PSM007095	2005-10-17		4	17:35	9.4	12.7	108.2	2.8
PSM007095	2005-10-17		5	17:37	9.3	12.3	104.6	2.8
PSM007095	2005-10-17		kontroll	17:39	9.3	10.1	86	3
PSM007095	2005-10-17	4	void	18:09	8.5	11.4	95.4	2.8
PSM007095	2005-10-17		1	18:10	9.1	12	101.4	2.8
PSM007095	2005-10-17		2	18:12	9.1	12.3	104.2	2.8
PSM007095	2005-10-17		3	18:13	9.2	11.5	97.7	2.8
PSM007095	2005-10-17		4	18:14	9.3	12.3	104.7	2.8
PSM007095	2005-10-17		5	18:16	9.3	12.1	102.9	2.8
PSM007095	2005-10-17		kontroll	18:17	9.2	10.1	86.1	3
PSM007095	2005-10-18	5	void	07:21	7.7	10.1	82.9	
PSM007095	2005-10-18		1	07:24	8.3	9.8	81.7	2.8
PSM007095	2005-10-18		2	07:26	8.3	9.7	81.2	2.8
PSM007095	2005-10-18		3	07:27	8.3	9.7	81.1	2.8
PSM007095	2005-10-18		4	07:29	8.2	9.8	81.7	2.8
PSM007095	2005-10-18		5	07:30	8.3	9.4	78.7	2.8
PSM007095	2005-10-18		kontroll	07:31	8.1	10	83.2	3
PSM007095	2005-10-18	6	void	10:57	8.4	10.3	87.3	

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007095	2005-10-18		1	10:57	8.5	10.6	90	2.8
PSM007095	2005-10-18		2	10:58	8.3	10.5	89.3	2.8
PSM007095	2005-10-18		3	11:00	8.4	10.2	87.1	2.8
PSM007095	2005-10-18		4	11:01	8.2	10.8	91.9	2.8
PSM007095	2005-10-18		5	11:03	8.1	10.3	87.6	2.8
PSM007095	2005-10-18		kontroll	11:05	8.2	10.2	86.7	3
PSM007095	2005-10-18	7	void	11:27	8.2	10.7	91.4	
PSM007095	2005-10-18		1	11:25	8.2	10.6	90.6	2.8
PSM007095	2005-10-18		2	11:28	7.9	10.7	91	2.8
PSM007095	2005-10-18		3	11:29	7.9	10.7	90.8	2.8
PSM007095	2005-10-18		4	11:29	7.9	10.7	91.2	2.8
PSM007095	2005-10-18		5	11:30	7.9	10.7	90.6	2.8
PSM007095	2005-10-18		kontroll	11:31	7.8	10.7	90.5	3
PSM007095	2005-10-18	8	void	17:50	8.5	12	104	
PSM007095	2005-10-18		1	17:51	8.9	12.4	108.8	2.8
PSM007095	2005-10-18		2	17:52	8.9	12.9	113.4	2.8
PSM007095	2005-10-18		3	17:53	8.9	12.1	105.5	2.8
PSM007095	2005-10-18		4	17:54	9	13.3	116.7	2.8
PSM007095	2005-10-18		5	17:55	9	12.5	109.6	2.8
PSM007095	2005-10-18		kontroll	17:57	8.9	10.9	94.4	3
PSM007095	2005-10-19	9	void	08:10	7.3	10.6	90.9	
PSM007095	2005-10-19		1	08:13	7.9	10.3	89.8	2.8
PSM007095	2005-10-19		2	08:14	7.8	10.1	87.6	2.8
PSM007095	2005-10-19		3	08:15	7.8	10	86.9	2.8
PSM007095	2005-10-19		4	08:16	7.7	10.6	91.1	2.8
PSM007095	2005-10-19		5	08:17	7.8	9.9	85.3	2.8
PSM007095	2005-10-19		kontroll	08:18	7.7	10.7	92.2	3
PSM007094	2005-10-19	1	void	11:12	7.4	11.7	98.7	2.5
PSM007094	2005-10-19		1	11:13	7.1	11.9	99.8	2.5
PSM007094	2005-10-19		2	11:14	7.1	12.1	101.2	2.5
PSM007094	2005-10-19		3	11:15	7	12.1	100.2	2.5
PSM007094	2005-10-19		4	11:16	6.9	12	99.5	2.5
PSM007094	2005-10-19		5	11:17	6.8	12	98.6	2.5
PSM007094	2005-10-19		kontroll	11:18	6.8	11.9	98.3	2.5
PSM007094	2005-10-19	2	void	17:52	7.2	12.1	101.2	2.5
PSM007094	2005-10-19		1	17:53	7.5	13.3	111.6	2.5
PSM007094	2005-10-19		2	17:54	7.6	16.7	140.8	2.5
PSM007094	2005-10-19		3	17:55	7.6	15.6	131.7	2.5
PSM007094	2005-10-19		4	17:56	7.5	14.3	120.5	2.5
PSM007094	2005-10-19		5	17:58	7.5	12.3	104	2.5
PSM007094	2005-10-19		kontroll	17:59	7.5	11.9	100.9	2.5
PSM007094	2005-10-20	3	void	07:42	7.2	11.7	98.7	2.5
PSM007094	2005-10-20		1	07:47	7.4	10	84.9	2.5
PSM007094	2005-10-20		2	07:49	7.4	10.7	90.8	2.5
PSM007094	2005-10-20		3	07:50	7.4	11.2	95	2.5
PSM007094	2005-10-20		4	07:51	7.3	10.8	91.6	2.5
PSM007094	2005-10-20		5	07:54	7.4	9.9	84.4	2.5
PSM007094	2005-10-20		kontroll	07:55	7.3	11.8	99.8	2.5
PSM007094	2005-10-20	4	void	11:37	7.9	11.9	101.6	2.5

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007094	2005-10-20		1	11:42	7.7	11.1	93.7	2.5
PSM007094	2005-10-20		2	12:44	7.8	13.2	110.8	2.5
PSM007094	2005-10-20		3	13:44	7.7	12.9	108.1	2.5
PSM007094	2005-10-20		4	14:46	7.8	11.8	99.1	2.5
PSM007094	2005-10-20		5	15:48	7.8	10.5	87.8	2.5
PSM007094	2005-10-20		kontroll	16:48	7.5	11.8	98.2	2.5
PSM007095	2006-01-19		void	10:26	1.1	9.6	72.4	
PSM007095	2006-01-19		1	10:27	1.8	7.7	59.3	2.5
PSM007095	2006-01-19		2	10:29	1.6	7.8	59.7	2.5
PSM007095	2006-01-19		3	10:29	1.2	8.9	67.1	2.5
PSM007095	2006-01-19		4	10:31	1.5	7.9	60.2	2.5
PSM007095	2006-01-19		5	10:32	1.3	8.4	63.5	2.5
PSM007095	2006-01-19		kontroll	10:34	1.2	8.9	67.6	
PSM007095	2006-01-19	2	void	16:14	0.6	10	74.1	
PSM007095	2006-01-19		1	16:16	1.9	7.7	59.4	2.5
PSM007095	2006-01-19		2	16:18	1.9	7.7	59	2.5
PSM007095	2006-01-19		3	16:19	1.7	9	69.1	2.5
PSM007095	2006-01-19		4	16:20	2	8	61.7	2.5
PSM007095	2006-01-19		5	16:21	1.6	8.3	63.5	2.5
PSM007095	2006-01-19		kontroll	16:22	1.6	9	68.6	
PSM007095	2006-01-20	3	void	09:18	1	9.5	-	
PSM007095	2006-01-20		1	09:24	2.3	7.2	55.2	2.5
PSM007095	2006-01-20		2	09:26	2	6.3	47.9	2.5
PSM007095	2006-01-20		3	09:27	2.1	8.8	67.2	2.5
PSM007095	2006-01-20		4	09:29	2.2	6.9	52.8	2.5
PSM007095	2006-01-20		5	09:31	2.4	8	62	2.5
PSM007095	2006-01-20		kontroll	09:32	2	9	69.2	
PSM007094	2006-01-16	1	void	16:46		14.3	107	
PSM007094	2006-01-16		1	16:47		14.3	106.8	2
PSM007094	2006-01-16		2	16:48		14.4	107.2	2.3
PSM007094	2006-01-16		3	16:49	1.2	14.4	107.3	2.4
PSM007094	2006-01-16		4	16:51	1.2	14.3	106.9	2.7
PSM007094	2006-01-16		5	16:52	1.3	14.3	107.2	2.7
PSM007094	2006-01-16		kontroll	16:53	1.3	14.4	107.3	3
PSM007094	2006-01-17	2	void	08:54	1.7	14.2	103.4	
PSM007094	2006-01-17		1	08:54	1.6	13.1	95.7	2
PSM007094	2006-01-17		2	08:56	1.6	12.6	92.1	2.3
PSM007094	2006-01-17		3	08:58	1.6	12.7	93.5	2.4
PSM007094	2006-01-17		4	08:59	1.6	12.7	93.5	2.7
PSM007094	2006-01-17		5	09:02	1.6	12.8	94.8	2.7
PSM007094	2006-01-17		kontroll	09:03	1.7	14.3	105.4	3
PSM007094	2006-01-17	3	void	15:17	1	14.5	108.1	
PSM007094	2006-01-17		1	15:21	1.5	13.4	100.8	2
PSM007094	2006-01-17		2	15:24	1.6	13.5	101.8	2.3
PSM007094	2006-01-17		3	15:27	1.5	13.7	103	2.4
PSM007094	2006-01-17		4	15:29	1.4	14	105.3	2.7
PSM007094	2006-01-17		5	15:30	1.3	14	104.8	2.7
PSM007094	2006-01-17		kontroll	15:32	1.3	14.3	107	3
PSM007093	2006-01-18	1	void	09:34	1.2	12	90	

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007093	2006-01-18		1	09:35	1.4	11.8	88.8	2.2
PSM007093	2006-01-18		2	09:35	1.3	11.8	88.9	2
PSM007093	2006-01-18		3	09:36	1.2	11.8	88.5	2
PSM007093	2006-01-18		4	09:37	1.4	11.8	89	2
PSM007093	2006-01-18		5	09:39	1.5	11.7	88.3	1.7
PSM007093	2006-01-18		kontroll	09:40	1.3	11.7	88.1	
PSM007093	2006-01-18	2	void	15:35	1.2	12	85.5	
PSM007093	2006-01-18		1	15:36	1.7	11.7	84.7	
PSM007093	2006-01-18		2	15:37	1.7	11.6	84.7	
PSM007093	2006-01-18		3	15:39	1.7	11.6	84.7	
PSM007093	2006-01-18		4	15:40	1.7	11.7	85.8	
PSM007093	2006-01-18		5	15:41	1.7	11.7	86.3	
PSM007093	2006-01-18		kontroll	15:42	1.5	11.8	86.8	
PSM007093	2006-01-19	3	void	09:02	1	12	86	
PSM007093	2006-01-19		1	09:04	1.7	10.5	77.2	
PSM007093	2006-01-19		2	09:06	1.8	10.5	77.7	
PSM007093	2006-01-19		3	09:07	1.8	9.7	72.6	
PSM007093	2006-01-19		4	09:08	1.7	11	82.1	
PSM007093	2006-01-19		5	09:10	1.8	11.2	83.7	
PSM007093	2006-01-19		kontroll	09:11	1.7	11.8	87.9	
PSM007093	2006-01-19	4	void	15:20	1.2	11.9	87.4	
PSM007093	2006-01-19		1	15:21	1.7	10.5	78.7	
PSM007093	2006-01-19		2	15:22	1.7	11.1	83.3	
PSM007093	2006-01-19		3	15:24	1.8	9.6	71.9	
PSM007093	2006-01-19		4	15:25	1.7	10.5	79.3	
PSM007093	2006-01-19		5	15:25	1.7	11.4	86.1	
PSM007093	2006-01-19		kontroll	15:26	1.6	11.8	88.9	
PSM007095	2006-04-10		void	19:20	3.8	9.3	70.4	
PSM007095	2006-04-10		1	19:22	3.8	6.7	50.3	2.5
PSM007095	2006-04-10		2	19:25	3.8	6.2	46.8	2.5
PSM007095	2006-04-10		3	19:26	3.7	6.7	50.6	2.5
PSM007095	2006-04-10		4	19:27	3.7	7.7	värde saknas	2.5
PSM007095	2006-04-10		5	19:30	3.7	5.6	42.6	2.5
PSM007095	2006-04-10		kontroll	19:32	3.6	9.1	68.7	3
PSM007095	2006-04-11	2	void	07:36	3.7	4.1	30.7	
PSM007095	2006-04-11		1	07:37	3.7	5.1	38.7	2.5
PSM007095	2006-04-11		2	07:38	3.7	5.1	38.5	2.5
PSM007095	2006-04-11		3	07:40	3.8	3.6	27.5	2.5
PSM007095	2006-04-11		4	07:43	3.8	5.5	41.8	2.5
PSM007095	2006-04-11		5	07:46	3.8	3.7	27.6	2.5
PSM007095	2006-04-11		kontroll	07:48	3.8	8.8	66.5	3
PSM007095	2006-04-11	3	void	17:34	5.9	9.1	78	
PSM007095	2006-04-11		1	17:38	4.3	3.9	29.7	2.5
PSM007095	2006-04-11		2	17:40	4.3	3.7	28.6	2.5
PSM007095	2006-04-11		3	17:41	4.2	3.6	27.9	2.5
PSM007095	2006-04-11		4	17:43	4.2	5	38.5	2.5
PSM007095	2006-04-11		5	17:45	4.3	3.7	28.8	2.5
PSM007095	2006-04-11		kontroll	17:46	4.2	8.7	66.8	3

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007095	2006-04-11		void	17:37	4.4	2.8	21.5	
PSM007093	2006-04-11		void	19:36	3.6	15.7	118.7	
PSM007093	2006-04-11		1	19:37	3.8	16.5	124.9	2.5
PSM007093	2006-04-11		2	19:38	3.7	16.3	123.6	2.5
PSM007093	2006-04-11		3	19:39	3.6	16.4	123.9	2.5
PSM007093	2006-04-11		4	19:40	2.9	16.9	125.2	2.5
PSM007093	2006-04-11		5	19:42	3.7	15.7	118.9	2.5
PSM007093	2006-04-11		kontroll	19:44	5.4	13.5	106.8	2.5
PSM007093	2006-04-12	2	void	07:24	3.9	15.8	120.3	
PSM007093	2006-04-12		1	07:26	3.6	16.5	125	2.5
PSM007093	2006-04-12		2	07:26	3.5	16.4	123.6	2.5
PSM007093	2006-04-12		3	07:27	3.5	16.3	122.9	2.5
PSM007093	2006-04-12		4	07:29	3.5	13.9	104.8	2.5
PSM007093	2006-04-12		5	07:30	3.5	14.7	111.1	2.5
PSM007093	2006-04-12		kontroll	07:32	3.9	13.4	102.4	2.5
PSM007093	2006-04-12	3	void	15:52	4.2	18.1	138.8	
PSM007093	2006-04-12		1	15:52	4.2	18.2	139.9	2.5
PSM007093	2006-04-12		2	15:53	4.1	18.4	141.4	2.5
PSM007093	2006-04-12		3	15:55	4.1	18.9	144.9	2.5
PSM007093	2006-04-12		4	15:56	4.1	18.7	143.1	2.5
PSM007093	2006-04-12		5	15:57	3.9	16.9	128.9	2.5
PSM007093	2006-04-12		kontroll	16:00	4	13.5	103.1	2.5
PSM007094	2006-04-09	1	void	19:45	4.8	15.4	121.8	
PSM007094	2006-04-09		1	19:47	5.2	15.3	121.5	2.5
PSM007094	2006-04-09		2	19:49	5.2	15.1	120.3	2.6
PSM007094	2006-04-09		3	19:50	5.3	14.3	114	2.4
PSM007094	2006-04-09		4	19:51	5.1	15.1	120.3	3
PSM007094	2006-04-09		5	19:53	5.1	14.7	117	2.9
PSM007094	2006-04-09		kontroll	19:54	5.1	15.4	122.1	3
PSM007094	2006-04-10	2	void	07:26	5.1	14.4	113.6	
PSM007094	2006-04-10		1	07:27	5	14.3	113	2.5
PSM007094	2006-04-10		2	07:29	4.7	13.8	108.4	2.6
PSM007094	2006-04-10		3	07:30	4.6	12.5	97.7	2.4
PSM007094	2006-04-10		4	07:31	4.5	14.1	109.9	3
PSM007094	2006-04-10		5	07:33	4.5	12.6	98.1	2.9
PSM007094	2006-04-10		kontroll	07:34	4.5	15.3	119.4	3
PSM007094	2006-04-10	3	void	13:59	4.8	15.2	118.8	
PSM007094	2006-04-10		1	13:59	4.8	16	124.8	2.5
PSM007094	2006-04-10		2	14:00	4.6	15.3	119	2.6
PSM007094	2006-04-10		3	14:01	4.6	15.2	118.3	2.4
PSM007094	2006-04-10		4	14:02	4.6	16.1	125.5	3
PSM007094	2006-04-10		5	14:04	4.6	15.1	117.1	2.9
PSM007094	2006-04-10		kontroll	14:05	4.6	15.3	118.6	3
PSM007094	2006-04-10	4	void	17:31	4.3	15.7	121	
PSM007094	2006-04-10		1	17:32	4.7	18	140.2	2.5
PSM007094	2006-04-10		2	17:33	4.6	16.5	128.2	2.6
PSM007094	2006-04-10		3	17:34	4.7	17.1	132.8	2.4
PSM007094	2006-04-10		4	17:36	4.8	18.1	140.8	3
PSM007094	2006-04-10		5	17:37	4.5	16.4	127	2.9

Site	Date	Meas. no	Chamber	Time	Temp. (C)	Oxygen conc. O2/l	Oxygen sat. (%)	Chamber hight (dm)
PSM007094	2006-04-10		kontroll	17:39	4.6	15.4	119.1	3
PSM107794	2006-07-03	1	void	14:21	25.3	13.2	153.1	
PSM107794	2006-07-03		1	14:24	25.7	12.8	148.8	3
PSM107794	2006-07-03		2	14:26	25.6	12.7	146.1	3
PSM107794	2006-07-03		3	14:27	25.8	12.5	144.5	3
PSM107794	2006-07-03		4	14:28	25.7	13.2	152.1	3
PSM107794	2006-07-03		5	14:29	25.7	11.8	136	3
PSM107794	2006-07-03		kontroll	14:22	25.5	13	150.3	3
PSM107794	2006-07-03	2	void	18:37	25.1	12.9	159.6	
PSM107794	2006-07-03		1	18:30	25.6	13.4	167.2	3
PSM107794	2006-07-03		2	18:32	25.9	13.3	167.5	3
PSM107794	2006-07-03		3	18:33	26.3	13.2	167.3	3
PSM107794	2006-07-03		4	18:34	26.2	14.3	180.8	3
PSM107794	2006-07-03		5	18:35	26.2	11.5	145.3	3
PSM107794	2006-07-03		kontroll	18:29	25.7	12.9	161.7	3
PSM107794	2006-07-03	3	void	21:40	24	12		
PSM107794	2006-07-03		1	21:29	24.7	12.3		3
PSM107794	2006-07-03		2	21:32	24.8	12.4		3
PSM107794	2006-07-03		3	21:35	25.1	12.1		3
PSM107794	2006-07-03		4	21:37	25.1	13.3		3
PSM107794	2006-07-03		5	21:39	24.7	10.7		3
PSM107794	2006-07-03		kontroll	21:27	24.7	12.8		3
PSM107794	2006-07-04		void	08:33	23.7	10	118.5	
PSM107794	2006-07-04	4	1	08:37	22.7	9.3	107.1	3
PSM107794	2006-07-04		2	08:39	22.7	8.4	96.4	3
PSM107794	2006-07-04		3	08:41	22.7	7.6	87.1	3
PSM107794	2006-07-04		4	08:43	22.7	9.2	104.3	3
PSM107794	2006-07-04		5	08:45	22.6	7.4	82.8	3
PSM107794	2006-07-04		kontroll	08:34	23	12.1	141.1	3
PSM107794	2006-07-04	5	void	11:12	24.2	11.5	134	
PSM107794	2006-07-04		1	11:14	24.3	10.1	117.3	3
PSM107794	2006-07-04		2	11:16	24.6	9.7	114.3	3
PSM107794	2006-07-04		3	11:20	24.5	9.5	113.3	3
PSM107794	2006-07-04		4	11:22	24.8	11.6	139.4	3
PSM107794	2006-07-04		5	11:23	24.4	8.1	96.3	3
PSM107794	2006-07-04		kontroll	11:13	23.9	12.5	144.2	3
PSM107794	2006-07-04	6	void	14:24	26.2	12.9	162.9	
PSM107794	2006-07-04		1	14:26	26	12.1	152.1	3
PSM107794	2006-07-04		2	14:27	26.1	11.9	149.3	3
PSM107794	2006-07-04		3	14:28	26.2	12.6	158.3	3
PSM107794	2006-07-04		4	14:29	26.2	13.2	165.9	3
PSM107794	2006-07-04		5	14:29	26.2	10.3	128.9	3

Appendix 1b. Irradiance measurement in water.

Site	Date	Measurement	Time	Depth (m)	Irradiance (PAR; μE m^{-2} s^{-2})	Comments
PSM007093	2005-07-13	1	08:56	0	930	
PSM007093	2005-07-13	1	08:56	0.5	580	
PSM007093	2005-07-13	1	08:56	1	415	
PSM007093	2005-07-13	1	08:56	1.5	258	
PSM007093	2005-08-18	5	16:30	0	243	
PSM007093	2005-08-18	5	16:30	0.5	151	
PSM007093	2005-08-18	5	16:30	1	117	
PSM007093	2005-08-18	5	16:30	1.5	94	
PSM007093	2005-08-18	5	16:30	1.9	65	
PSM007093	2005-10-18	1	10:30	0	188.1	
PSM007093	2005-10-18	1	10:30	0.5	143.5	
PSM007093	2005-10-18	1	10:30	1	137.2	
PSM007093	2005-10-18	1	10:30	1.5	108.3	
PSM007093	2005-10-18	1	14:30	0	181	
PSM007093	2005-10-18	1	14:30	0.5	168	
PSM007093	2005-10-18	1	14:30	1	140	
PSM007093	2005-10-18	1	14:30	1.5	110	
PSM007093	2005-10-18	3	17:15	0	4.6	
PSM007093	2006-01-18	1	09:50	0	3.9	i ytan, isfritt
PSM007093	2006-01-18	1	09:50	0	2.75	i ytan, under isen
PSM007093	2006-01-18	1	09:50	1.5	0.9	på botten, under isen
PSM007093	2006-01-18	1	15:26	0	4.4	i ytan, isfritt
PSM007093	2006-01-18	1	15:26	0	0.66	i ytan, under isen med ca 1 cm snö på
PSM007093	2006-01-18	1	15:26	1.5	0.21	på botten, under isen med ca 1cm snö på
PSM007093	2006-04-12	1	07:46	0	79	
PSM007093	2006-04-12	1	07:46	botten	10.7	
PSM007093	2005-05-18	1	06:51	0	484	
PSM007093	2005-05-18	1	06:51	botten	192	
PSM007095	2005-05-20	1	09:30	0	1,260	
PSM007095	2005-05-20	1	09:30	1	447	
PSM007095	2005-08-18	1	12.00	0	490	
PSM007095	2005-08-18	1	12.00	0.5	220	
PSM007095	2005-08-18	1	12.00	1	150	
PSM007095	2005-10-17	1	09.30	0	42	
PSM007095	2005-10-17	1	09.30	0.5	31	
PSM007095	2005-10-17	1	09.30	1	18	
PSM007095	2005-10-17	1	09.30			
PSM007095	2005-10-17	2	14:20	0	84	
PSM007095	2005-10-17	2	15:20	0.5	65	
PSM007095	2005-10-17	2	16:20	1	42	
PSM007095	2005-10-17	2	16:20			
PSM007095	2005-10-17	3	17:30	0	2.27	
PSM007095	2005-10-17	3	17:30			
PSM007095	2005-10-17	6	11:00	0	230.1	
PSM007095	2005-10-17	6	11:00	0.5	173.3	
PSM007095	2005-10-17	6	11:00	1	144.9	
PSM007095	2005-10-17	6	11:00	1	18.9	
PSM007095	2006-01-19	1	10:09	0	12.8	i ytan, isfritt

Site	Date	Measurement	Time	Depth (m)	Irradiance (PAR; μE m^{-2} s^{-2})	Comments
PSM007095	2006-01-19	1	10:09	0	1	i ytan, under isen (ca 2 cm snö på isen)
PSM007095	2006-04-11	1	10:09	0	113	i ytan, isfritt
PSM007095	2006-04-11	1	10:09	0	48.3	i ytan, under isen
PSM007095	2006-04-11	1	10:09	1.5	8	på botten, i höjd med vegetationen
PSM007094	2005-05-18	1	06:12	yta	225	
PSM007094	2005-05-18	1	06:12	botten	106	
PSM007094	2005-05-18	2	09:00	yta	930	
PSM007094	2005-05-18	2	09:00	botten	480	
PSM007094	2005-05-18	3	16:00	yta	365	
PSM007094	2005-05-18	3	16:00	botten	159	
PSM007094	2005-05-18	4	08:00	yta	495	
PSM007094	2005-05-18	4	08:00	botten	410	
PSM007094	2005-05-18	5	08:15	yta	760	
PSM007094	2005-05-18	5	08:15	botten	400	
PSM007094	2005-07-11	1	11:55	0	1,500	
PSM007094	2005-07-11	1	11:55	0.5	1,242	
PSM007094	2005-07-11	1	11:55	1	870	
PSM007094	2005-07-11	1	11:55	1.5	662	
PSM007094	2005-07-11	1	11:55	2	370	
PSM007094	2005-07-11	2	17:30	0	770	
PSM007094	2005-07-11	2	17:30	0.5	550	
PSM007094	2005-07-11	2	17:30	1	220	
PSM007094	2005-07-11	2	17:30	1.5	38	
PSM007094	2005-07-11	2	17:30	2	5	
PSM007094	2005-08-17	1	13:37	0	475	
PSM007094	2005-08-17	1	13:37	0.5	380	
PSM007094	2005-08-17	1	13:37	1	205	
PSM007094	2005-08-17	1	13:37	1.5	187	
PSM007094	2005-08-17	1	13:37	2	135	
PSM007094	2005-10-19	1	10:30	0	235	
PSM007094	2005-10-19	1	10:30	0.5	234	
PSM007094	2005-10-19	1	10:30	1	192	
PSM007094	2005-10-19	1	10:30	1.5	153	
PSM007094	2005-10-19	1	10:30	1.7	125	
PSM007094	2005-10-19	4	12:00	0	220.1	
PSM007094	2005-10-19	4	12:00	0.5	203.6	
PSM007094	2005-10-19	4	12:00	1	152	
PSM007094	2005-10-19	4	12:00	1.7	128	
PSM007094	2006-01-16	1	15:50	0	0.7908	
PSM007094	2006-01-16	1	15:50	0.5		
PSM007094	2006-01-16	1	15:50	1	0.5032	
PSM007094	2006-01-16	1	15:50	1.5	0.2734	
PSM007094	2006-01-16	1	15:50	0	32.4	
PSM007094	2006-01-16	1	15:50	0.5	29.5	
PSM007094	2006-01-16	1	15:50	1	18.1	
PSM007094	2006-01-16	1	15:50	1.5	16.2	
PSM007094	2006-04-10	1	07:45	0	61	
PSM007094	2006-04-10	1	07:45	0.5	44	
PSM001468	2005-07-13	1	15:20	0	259	Mätningen gjordes i skuggade delar av Frisksjön

Site	Date	Measurement	Time	Depth (m)	Irradiance (PAR; μE m^{-2} s^{-2})	Comments
PSM001468	2005-07-13	1	15:20	0.5	121.5	
PSM001468	2005-07-13	1	15:20	1	41.25	
PSM001468	2005-07-13	1	15:20	1.5	1,068	
PSM001468	2005-07-13	1	15:20	2	3.17	
PSM001468	2005-07-13	1	15:20	2.5	1.21	
PSM001468	2005-07-13	2	15:28	0	1,225	Mätningen gjordes i soliga delar av Frisksjön
PSM001468	2005-07-13	2	15:28	0.5	457.8	
PSM001468	2005-07-13	2	15:28	1	227	
PSM001468	2005-07-13	2	15:28	1.5	78.7	
PSM001468	2005-07-13	2	15:28	2	20.9	
PSM001468	2005-07-13	2	15:28	2.5	12.37	
PSM001470	2005-08-18	1	11,00	0	430	
PSM001470	2005-08-18	1	11,00	0.5	220	
PSM001470	2005-08-18	1	11,00	1	190	
PSM001470	2005-08-18	1	11,00	1.5	220	
PSM001470	2005-08-18	1	11,00	2	210	
PSM001470	2005-08-18	1	11,00	2.5	120	
PSM001470	2005-08-18	1	11,00	3	110	
PSM001470	2005-08-18	1	11,00	3.5	77	
PSM001470	2005-08-18	1	11,00	4	77	
PSM001470	2005-07-14	1	15:25	0	1,245	
PSM001470	2005-07-14	1	15:25	1	1,080	
PSM001470	2005-07-14	1	15:25	2	655	
PSM001470	2005-07-14	1	15:25	3	321	
PSM001470	2005-07-14	1	15:25	4	231.9	
PSM001470	2005-07-14	1	15:25	4.3	205	
PSM001471	2005-07-25		14:20	0	1,250	
PSM001472	2005-07-25		14:20	0.5	830	
PSM107794	2005-07-19		14:40	0	1,400	
PSM107794	2005-07-19		14:40	0.5	120	
PSM107794	2005-07-19		14:40	1	50	
PSM001467	2005-07-13		12:00	0	1,335	
PSM001467	2005-07-13		12:00	0.5	886	
PSM001467	2005-07-13		12:00	1	586	
PSM001467	2005-07-13		12:00	1.5	560	
PSM001467	2005-07-13		12:00	2	413	
PSM001467	2005-07-13		12:00	2.5	326	
PSM001467	2005-07-13		12:00	3	255	
PSM001467	2005-07-13		12:00	4	141	
PSM001467	2005-07-13		12:00	5	71	
PSM001469	2005-07-14	1	11:45	0	1,580	
PSM001469	2005-07-14	1	11:45	0.5	1,011	
PSM001469	2005-07-14	1	11:45	1	630	
PSM001469	2005-07-14	1	11:45	1.5	478	
PSM001469	2005-07-14	1	11:45	1.75	355	

Appendix 2

Analysis of water samples

Appendix 2. Water chemistry analysis in chamber water, sampled May 2005.

Site	Date	Time	Sample	NH4-N µg/l	PO4-P µg/l	(NO2+NO3)-N µg/l	Tot-P µg/l	TOT-N µg/l	IC mg/l	pH	Frozen horizontally	Comment
PSM007095	2005-05-19	13.03	VOID	2.4	3.5	0.8	24.4	571	13.4	8.7		
Sketudden		13.04	I	2.5	2.8	0.5	23.4	560	12.5	8.9		Some sediment in sample
		13.06	II	2.3	2.1	0.8	20.6	545	13.0	8.9		
		13.07	III	2.3	2.9	0.4	23.3	556	13.8	8.5		Some sediment in sample
		13.08	IV	2.3	2.6	0.7	21.8	566	13.2	8.8		Some sediment in sample
		13.10	V	2.6	5.7	0.4	35.9	701	13.2	8.8		Some sediment in sample
PSM007095	2005-05-19	20.00	VOID	2.6	3.3	0.7	24.1	529	13.6	8.6	(x)	
Sketudden		20.00	1	10.8	44.2	0.6	140	1.620	13.1	8.5	x	Mycket sed i provet
		20.00	2	2.8	3.3	0.5	24.5	541	13.2	8.6	x	(Some sediment in sample)
		20.00	3	2.3	2.4	0.4	22.1	534	12.4	8.9	x	
		20.00	4	3.0	2.2	0.4	20.9	525	12.8	8.6	x	
		20.00	5	2.8	2.8	0.6	26.0	570	13.4	8.5	(x)	
PSM007095	2005-05-20	9.34	VOID	2.4	2.7	0.4	23.2	570	13.4	9.0		
Sketudden		9.36	1	7.7	15.9	0.7	116	1.540	17.3	8.4	x	Sediment in sample
		9.37	2	11.8	2.3	0.6	22.1	562	14.2	8.3		
		9.39	3	19.1	2.2	0.8	22.5	568	14.4	8.7	(x)	
		9.41	4	16.4	2.5	0.7	22.6	578	14.0	8.8		
		9.43	5	18.7	2.3	0.6	21.8	550	14.1	8.8		
PSM 007093	2005-05-18	6.45	VOID	1.3	7.9	0.3	20.6	297	14.8	8.7		
Mellan benen		6.45	I	1.2	8.9	0.3	21.0	307	16.2	8.5	x	
		6.45	II	1.3	8.2	0.2	21.5	309	14.6	8.9	x	(Some sediment in sample)
		6.45	III	1.3	8.1	0.3	23.2	325	14.9	8.6	x	(Some sediment in sample)
		6.45	IV	1.3	8.2	0.2	21.5	317	14.5	8.8	x	
		6.45	V	1.3	8.7	0.2	22.2	310	15.8	8.7	x	
PSM 007093	2005-05-18	16.45	VOID	1.5	12.2	0.4	34.5	356	14.6	8.8		Sediment in sample

Site	Date	Time	Sample	NH4-N µg/l	PO4-P µg/l	(NO2+NO3)-N µg/l	Tot-P µg/l	TOT-N µg/l	IC mg/l	pH	Frozen horizontally	Comment
Mellan benen		16.45	I	2.1	9.5	0.5	25.4	328	14.3	8.9		Some sediment in sample
		16.45	II	3.4	6.7	0.3	20.7	333	12.9	9.2	x	
		16.45	IV	3.4	8.2	0.3	26.0	345	14.8	8.9		Some sediment in sample
		16.45	V	3.3	12.8	0.3	33.3	366	14.2	8.9		Sediment in sample
PSM 007093	2005-05-19	9.15	VOID	1.6	8.9	0.2	24.8	315	15.0	8.5	x	
Mellan benen		9.15	1	2.2	5.5	0.3	20.6	320	14.8	8.2	x	
		9.15	2	2.7	8.3	0.3	28.6	351	16.0	8.3	x	sediment in sample
		9.15	4	1.9	4.4	0.3	24.6	352	16.4	8.2	x	sediment in sample
		9.15	5	9.0	6.9	0.3	23.4	322	16.1	8.4	x	sediment in sample
PSM 007094	2005-05-18	5.40	I	1.3	11.0	0.4	23.9	293	16.9	8.8	x	
Åkvik		5.40	II	1.1	11.0	0.6	22.1	300	16.5	8.9		
		5.40	III	1.2	10.4	0.5	21.2	287	16.2	8.8	x	
		5.40	IV	1.5	10.6	0.5	23.7	306	16.8	8.6	x	(Some sediment in sample)
		5.40	V	1.3	10.7	0.6	22.1	292	16.0	8.8	x	
PSM 007094	2005-05-18	15.00	VOID	1.4	10.4	0.5	20.8	290	15.1	8.9	x	
Åkvik		15.00	I	4.1	24.9	0.7	39.1	327	15.5	8.9	x	
		15.00	II	14.2	32.5	1.1	47.6	344	15.0	8.9	x	(Some sediment in sample)
		15.00	III	6.1	18.7	0.6	30.3	312	16.2	9.1	x	(some sediment in sample)
		15.00	IV	15.7	20.9	0.9	36.9	344	15.5	9.0	x	
		15.00	V	7.2	18.0	1.1	28.6	306	15.5	8.9	x	
PSM 007094	2005-05-19	8.00	VOID	1.0	11.2	0.4	21.7	273	16.8	8.5	x	
Åkvik		8.00	1	5.9	45.4	0.8	61.4	348	17.2	8.4	x	Some sediment in sample
		8.00	2	36.6	79.0	2.4	97.7	392	17.2	8.2	x	Some sediment in sample
		8.00	3	5.5	24.4	1.2	40.0	339	16.6	8.3	x	Some sediment in sample
		8.00	4	52.3	39.5	2.7	103	860	16.8	8.3	x	Sediment in sample
		8.00	5	9.8	27.4	2.5	51.2	393	17.2	8.3	x	Some sediment in sample
PSM 007094	2005-05-19	22.00	VOID	2.6	12.6	0.5	23.5	302	14.7	8.9	x	
Åkvik		22.00	1	4.7	53.9	0.7	67.6	346	15.7	8.7		
		22.00	2	32.8	80.0	2.5	97.8	390	15.9	8.6	(x)	Some sediment in sample
		22.00	3	7.6	27.1	1.1	41.6	344	15.1	8.9		
		22.00	4	64.4	39.9	2.6	55.7	414	16.0	8.8	x	
		22.00	5	9.7	29.0	2.2	44.6	372	15.7	8.5	(x)	

Appendix 3

Elements analysed and elemental content of *Chara spp.*

Date		2005-07-12	2005-07-12	2005-07-12	2005-07-12	2005-07-12	2005-10-19	2005-10-19	2005-10-19	2005-10-19	2005-10-19	2006-01-20
ELEMENT	SAMPLE	197	198	199	200	201	63	64	65	68	69	46
TS	%	94.6	92.5	94.3	94.2	93.9	89.2	90.9	89.5	89.8	90.3	92.3
		July	July	July	July	July	October	October	October	October	October	January
C-tot	mg/kg TS	253,900	304,800	256,500	251,400	250,200	346,100	302,700	296,000	303,000	320,600	337,200
N-tot	mg/kg TS	10,970	12,470	9,290	8,490	10,610	10,410	10,410	8,310	10,550	10,830	24,750
Si	mg/kg TS	4,800	4,860	3,710	2,770	2,690	1,950	5,830	2,720	3,150	2,930	10,500
Al	mg/kg TS	750	937	637	550	521	301	952	402	453	402	1,410
Ca	mg/kg TS	179,000	124,000	190,000	193,000	170,000	37,700	74,400	52,600	53,100	41,000	26,200
Fe	mg/kg TS	517	563	467	344	416	233	531	285	340	386	1,370
K	mg/kg TS	3,990	2,780	1,990	288	609	2,970	3,440	7,280	4,070	3,610	3,980
Mg	mg/kg TS	5,640	6,420	5,060	4,270	4,880	7,310	6,290	7,380	6,690	6,600	5,040
Mn	mg/kg TS	97.1	63.6	91.3	63.5	96.3	72.3	116	99.8	79.1	70	330
Na	mg/kg TS	7,030	6,200	4,570	1,900	2,380	8,070	6,650	13,700	7,930	8,630	4,170
P	mg/kg TS	988	653	811	728	731	441	858	572	571	486	1,010
Ti	mg/kg TS	12.3	15	9.39	7.42	6.41	4.76	14.4	6.7	8.03	7.98	28.3
Br	mg/kg TS	38.3	27.7	31.5	25	27.4	27	47	49.6	34.5	35.6	61.5
I	mg/kg TS	37.8	25.8	37.9	43.1	48.7	31.2	42.3	34.5	34.9	31.4	91.3
Cl	mg/kg TS	12,700	8,910	8,290	1,650	1,720	2,480	2,960	8,080	3,320	3,590	3,480
Ba	mg/kg TS	62.5	55.4	63.3	73.6	61.8	43.8	51	45.4	45.9	42.7	29.6
Cu	mg/kg TS	3.78	4.41	4.84	9.88	6.65	2.75	3.24	1.48	2.59	2.35	9.12
Cr	mg/kg TS	0.664	0.618	0.456	0.436	0.37	0.26	0.646	0.268	0.405	0.326	1.34
Ni	mg/kg TS	2.44	2.47	2.11	2.21	2.26	2.8	3.14	2.74	2.81	2.16	5.47
Sc	mg/kg TS	0.21	0.173	0.169	0.19	0.147	0.0569	0.167	0.0664	0.1	0.0574	0.275
Sr	mg/kg TS	2,800	1,980	2,930	2,970	2,610	568	1,150	807	798	615	352
V	mg/kg TS	1.26	1.08	0.906	0.809	0.909	0.709	1.26	0.523	0.848	0.902	2.89
Y	mg/kg TS	1.92	1.98	1.66	1.71	1.57	1	2.38	1.19	1.59	1.41	4.17
Zr	mg/kg TS	2.94	3.02	2.33	2.64	2.26	1.58	3.22	1.93	2.36	2.02	6.07
Hf	mg/kg TS	0.0289	0.0292	0.0232	0.0232	0.0216	0.0131	0.032	0.0176	0.0231	0.0184	0.0588
Ga	mg/kg TS	0.103	0.155	0.0635	0.056	0.0484	0.0423	0.117	0.0635	0.0867	0.0609	0.175
Mo	mg/kg TS	0.251	0.239	0.274	0.211	0.235	0.297	0.359	0.143	0.354	0.313	0.689
Nb	mg/kg TS	0.0945	0.105	0.0768	0.0675	0.079	0.0471	0.114	0.054	0.0754	0.0588	0.231

Date		2005-07-12	2005-07-12	2005-07-12	2005-07-12	2005-07-12	2005-10-19	2005-10-19	2005-10-19	2005-10-19	2005-10-19	2006-01-20
ELEMENT	SAMPLE	197	198	199	200	201	63	64	65	68	69	46
TS	%	94.6	92.5	94.3	94.2	93.9	89.2	90.9	89.5	89.8	90.3	92.3
		July	July	July	July	July	October	October	October	October	October	January
Rb	mg/kg TS	0.961	1.22	0.721	0.487	0.386	0.62	1.39	1.04	0.752	0.821	1.97
Sn	mg/kg TS	0.0618	0.0645	0.0524	0.0468	0.047	0.0467	0.078	0.0519	0.056	0.0488	0.13
Ta	mg/kg TS	0.0126	0.0092	0.0069	0.0065	0.0077	0.0083	0.01	0.0096	0.0088	0.0111	0.0147
Th	mg/kg TS	0.266	0.258	0.201	0.176	0.15	0.101	0.299	0.143	0.161	0.165	0.645
U	mg/kg TS	0.715	0.667	0.706	0.873	0.868	0.284	0.493	0.271	0.396	0.336	0.606
W	mg/kg TS	0.0425	0.034	0.0333	0.0278	0.0391	0.0242	0.0601	0.0264	0.0296	0.0254	0.0908
La	mg/kg TS	2.81	3.12	2.45	2.47	2.6	1.41	3.65	1.62	2.24	2.04	7.22
Ce	mg/kg TS	4.9	5.68	4.35	4.2	4.41	2.7	6.11	3.06	4.2	3.85	14
Pr	mg/kg TS	0.632	0.739	0.581	0.567	0.564	0.357	0.804	0.37	0.549	0.51	1.76
Nd	mg/kg TS	2.63	2.89	2.46	2.22	2.27	1.44	3.34	1.54	2.19	2.11	6.91
Sm	mg/kg TS	0.561	0.595	0.464	0.464	0.46	0.304	0.679	0.318	0.455	0.442	1.42
Eu	mg/kg TS	0.122	0.131	0.107	0.11	0.108	0.0732	0.147	0.0752	0.0978	0.0949	0.253
Gd	mg/kg TS	0.327	0.356	0.283	0.29	0.288	0.188	0.435	0.203	0.282	0.275	0.864
Tb	mg/kg TS	0.0443	0.0471	0.039	0.0378	0.0361	0.0247	0.0572	0.0277	0.0394	0.0355	0.115
Dy	mg/kg TS	0.329	0.351	0.281	0.275	0.269	0.183	0.443	0.202	0.283	0.255	0.815
Ho	mg/kg TS	0.0615	0.0661	0.0528	0.0531	0.0513	0.0339	0.0774	0.0386	0.0515	0.0471	0.147
Er	mg/kg TS	0.18	0.211	0.152	0.159	0.151	0.0997	0.232	0.114	0.157	0.138	0.42
Tm	mg/kg TS	0.0256	0.0279	0.0219	0.0225	0.0222	0.014	0.0329	0.0175	0.0228	0.0196	0.0604
Yb	mg/kg TS	0.178	0.178	0.141	0.144	0.141	0.0957	0.215	0.111	0.148	0.126	0.381
Lu	mg/kg TS	0.028	0.0301	0.0243	0.0256	0.0243	0.0153	0.0367	0.0221	0.0267	0.0227	0.0618
Li	mg/kg TS	1.38	1.18	0.941	0.612	0.646	0.929	1.4	2.03	0.929	1.09	1.76
Zn	mg/kg TS	22.4	25.6	28.4	43.8	42.8	23.4	23.9	22.1	21.7	25.2	54.9
Be	mg/kg TS	0.132	0.162	< 0.1	< 0.1	< 0.1	< 0.1	0.146	< 0.1	0.202	< 0.1	0.246
Co	mg/kg TS	1.7	1.45	1.26	1.31	1.5	1.63	2.99	1.53	1.38	1.15	4.49
Cs	mg/kg TS	0.0343	0.0333	0.0243	0.0197	0.0148	0.0124	0.0368	0.0156	0.019	0.0213	0.0729
Pb	mg/kg TS	0.901	1.11	0.739	0.775	0.718	0.529	1.16	0.589	0.737	0.831	2.82
Sb	mg/kg TS	0.0279	0.0349	0.0195	0.0239	0.0271	0.0193	0.0257	0.0152	0.0218	0.0212	0.0516
Tl	mg/kg TS	0.0103	0.0146	0.0069	0.0063	0.0061	0.0071	0.0159	0.0088	0.0095	0.0092	0.0233
B	mg/kg TS	21.5	16.9	21.2	18.1	18.9	16.3	25.4	22	20.1	17.7	27.8
Se	mg/kg TS	0.185	0.255	0.279	0.146	0.153	0.187	0.244	0.272	0.143	0.219	0.359
S	mg/kg TS	3,390	3,620	3,040	2,430	2,940	4,720	5,040	7,360	5,250	4,770	5,980
As	mg/kg TS	0.668	0.436	0.601	0.477	0.516	0.402	0.795	0.71	0.68	0.508	1.8
Cd	mg/kg TS	0.184	0.172	0.17	0.191	0.202	0.128	0.183	0.121	0.131	0.117	0.44
Total	mg/kg TS	486,800.7012	478,458.8019	487,608.0668	471,098.9687	450,640.5357	423,493.1819	421,571.2607	405,799.1281	399,493.8701	404,704.5963	426,145.8353

Continued.

Date		2006-01-20	2006-01-20	2006-01-20	2006-01-20	2006-04-11	2006-04-11	2006-04-11	2006-04-11	2006-04-11
ELEMENT	SAMPLE	47	48	49	50	51	52	53	54	55
TS	%	91.5	91.1	91.1	91.4	91.2	90.6	91.1	90.7	90.9
		January	January	January	January	April	April	April	April	April
C-tot	mg/kg TS	345,800	337,600	324,200	325,900	322,700	319,500	353,100	315,400	333,600
N-tot	mg/kg TS	19,280	15,320	19,850	7,100	20,260	6,880	19,700	12,650	9,830
Si	mg/kg TS	8,800	3,620	8,670	5,020	10,700	13,800	9,950	6,900	5,460
Al	mg/kg TS	1,280	356	1,060	543	1,470	1,920	1,160	888	617
Ca	mg/kg TS	29,900	39,000	28,700	39,400	17,400	21,300	18,800	20,500	21,800
Fe	mg/kg TS	1,070	368	968	494	1,430	1,800	1,150	893	784
K	mg/kg TS	4,850	4,370	4,250	5,460	3,200	3,890	4,520	5,530	5,920
Mg	mg/kg TS	5,800	5,490	5,580	5,690	5,910	6,710	5,990	6,780	6,970
Mn	mg/kg TS	297	172	294	248	19.5	25.1	19.5	18.8	25.3
Na	mg/kg TS	5,560	5,230	5,680	5,970	3,180	3,970	3,420	5,190	5,450
P	mg/kg TS	852	749	885	766	1,010	777	947	831	758
Ti	mg/kg TS	23.9	5.91	21.2	9.52	34.4	42.3	27.4	44.5	16.6
Br	mg/kg TS	60.4	40.8	61.4	51.1	46.4	44.1	52.5	50.2	37.9
I	mg/kg TS	85.2	61	84.6	74.7	59.9	63.1	64.2	54.8	68.9
Cl	mg/kg TS	6,020	2,950	4,400	5,840	1,580	1,330	2,270	3,100	3,300
Ba	mg/kg TS	32.4	42.9	40.8	36.1	41.7	56.8	40.6	52.4	67.4
Cu	mg/kg TS	6.39	6.88	7.01	5.17	9.12	8.16	8.88	5.08	5.75
Cr	mg/kg TS	0.961	0.369	0.908	0.471	1.38	1.88	1.28	0.977	0.857
Ni	mg/kg TS	4.16	3.58	4.01	3.78	5.83	4.82	5.12	4.17	4.54
Sc	mg/kg TS	0.188	0.0768	0.187	0.0919	0.257	0.294	0.226	0.177	0.155
Sr	mg/kg TS	410	549	402	568	226	293	241	285	305
V	mg/kg TS	1.95	0.893	1.98	1.09	3.61	3.34	3.48	2.34	2.38
Y	mg/kg TS	3.23	1.63	3.45	2.11	4.24	4.3	4.4	3.54	3.13
Zr	mg/kg TS	4.54	2.16	4.69	2.68	7.4	6.61	6.42	5.3	4.38
Hf	mg/kg TS	0.0431	0.0193	0.0506	0.024	0.0753	0.0714	0.06	0.0555	0.0435
Ga	mg/kg TS	0.164	0.0469	0.15	0.0771	0.202	0.301	0.207	0.16	0.122
Mo	mg/kg TS	0.484	0.202	0.331	0.225	1.43	1	1.05	1.08	0.894
Nb	mg/kg TS	0.17	0.0675	0.166	0.0909	0.264	0.254	0.229	0.419	0.142
Rb	mg/kg TS	1.79	0.796	1.7	1.22	2	2.84	2.12	2	1.81
Sn	mg/kg TS	0.102	0.0596	0.107	0.0682	0.147	0.148	0.123	0.125	0.0866
Ta	mg/kg TS	0.0116	0.0109	0.0139	0.0088	0.0163	0.0184	0.0155	0.0334	0.0146
Th	mg/kg TS	0.479	0.141	0.46	0.188	0.733	0.883	0.59	0.496	0.407
U	mg/kg TS	0.44	0.247	0.38	0.281	0.736	0.715	0.703	0.494	0.553

Date		2006-01-20	2006-01-20	2006-01-20	2006-01-20	2006-04-11	2006-04-11	2006-04-11	2006-04-11	2006-04-11
ELEMENTSAMPLE		47	48	49	50	51	52	53	54	55
TS	%	91.5	91.1	91.1	91.4	91.2	90.6	91.1	90.7	90.9
		January	January	January	January	April	April	April	April	April
W	mg/kg TS	0.0513	0.031	0.0527	0.0326	0.105	0.0746	0.0899	0.0682	0.0569
La	mg/kg TS	5.32	2.71	6.37	3.36	7.84	8.36	9.6	5.96	6.19
Ce	mg/kg TS	9.87	4.87	11.6	6.02	13.7	15.3	16	11.1	10.7
Pr	mg/kg TS	1.26	0.599	1.44	0.761	1.92	2.09	2.36	1.57	1.45
Nd	mg/kg TS	5.08	2.41	5.7	3.03	7.9	8.39	9.05	6.31	5.84
Sm	mg/kg TS	1.06	0.476	1.14	0.616	1.55	1.72	1.78	1.32	1.16
Eu	mg/kg TS	0.196	0.105	0.224	0.121	0.299	0.327	0.313	0.239	0.222
Gd	mg/kg TS	0.633	0.306	0.724	0.399	0.967	1.02	1.06	0.792	0.691
Tb	mg/kg TS	0.0861	0.0393	0.0941	0.0521	0.127	0.135	0.132	0.105	0.0903
Dy	mg/kg TS	0.61	0.294	0.668	0.376	0.9	0.961	0.916	0.753	0.627
Ho	mg/kg TS	0.111	0.0532	0.122	0.0688	0.16	0.173	0.163	0.137	0.113
Er	mg/kg TS	0.328	0.154	0.358	0.207	0.462	0.491	0.464	0.383	0.323
Tm	mg/kg TS	0.0452	0.0218	0.051	0.0288	0.0638	0.0691	0.0631	0.0534	0.0451
Yb	mg/kg TS	0.295	0.142	0.318	0.192	0.41	0.444	0.381	0.332	0.283
Lu	mg/kg TS	0.0475	0.0241	0.0509	0.0313	0.0661	0.0718	0.0648	0.051	0.045
Li	mg/kg TS	1.73	0.794	1.42	0.862	2.68	3.62	2.19	2.69	2.82
Zn	mg/kg TS	42.7	44	43.2	35.6	62.7	52.3	49.2	49.8	51.8
Be	mg/kg TS	0.172	< 0.1	0.183	< 0.1	0.286	0.323	0.257	0.19	0.194
Co	mg/kg TS	3.31	2.73	3.55	3.04	2.04	2.01	1.7	2.03	2.43
Cs	mg/kg TS	0.0604	0.016	0.0592	0.0248	0.079	0.113	0.0661	0.0521	0.042
Pb	mg/kg TS	2.02	0.845	2.1	1.1	2.99	3.21	2.39	1.93	1.93
Sb	mg/kg TS	0.0392	0.0243	0.0382	0.0284	0.0609	0.054	0.0505	0.0485	0.0406
Tl	mg/kg TS	0.0153	0.009	0.0164	0.0065	0.0368	0.0344	0.0315	0.0239	0.0231
B	mg/kg TS	23.5	18.8	27.6	20.3	19.3	17.6	26.5	17.4	18.5
Se	mg/kg TS	0.286	0.201	0.261	0.267	0.296	0.327	0.297	0.301	0.347
S	mg/kg TS	6,060	5,100	5,670	5,000	6,840	7,060	7140	8,020	8,440
As	mg/kg TS	1.44	0.996	1.56	1.27	1.75	1.32	1.67	1.59	1.45
Cd	mg/kg TS	0.281	0.282	0.345	0.22	0.499	0.41	0.376	0.334	0.395
Total	mg/kg TS	436,306.5497	421,122.7217	410,951.839	408,266.0102	396,274.5282	389,617.9827	428,754.2684	387,319.71	403,583.1727