SMHI
Oceanographic Services
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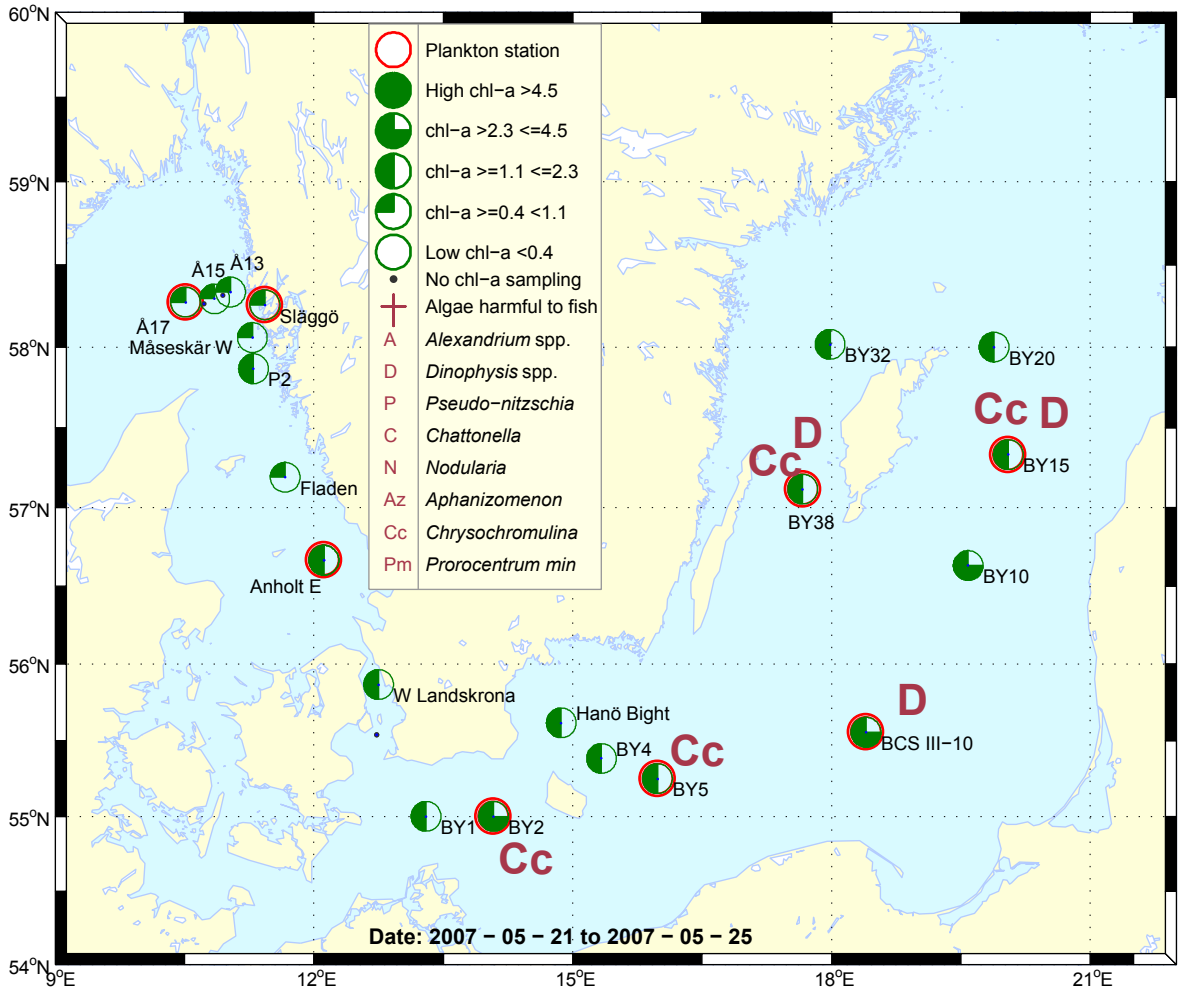
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

En typisk efterblomningssituation observerades i Skagerrak och Kattegatt, med en fattig planktonflora och låga klorofyll *a* värden. De senare låg under det normala vid samtliga stationer.

I Östersjön var det små arter som dominerade proverna. Den för fisk skadliga flagellaten *Chrysochromulina* spp. och cyanobakterien *Aphanizomenon* spp. fanns vid alla stationer i olika antal. En liten population av den potentiellt toxiska dinoflagellaten *Dinophysis acuminata* observerades vid BCS III. Klorofyll *a* värdena var normala eller över det normala i södra och sydöstra Östersjön, medan de var något under det normala öster och väster om Gotland.



Abstract

A post bloom situation was observed in the Skagerrak and Kattegat areas, with a poor plankton flora and low chlorophyll *a* values, which were below average at all stations.

In the Baltic small species dominated the samples. The icthyotoxic (toxic for fish) flagellate *Chrysochromulina* spp. was found at all stations in different numbers as was filaments of the cyanobacteria *Aphanizomenon* spp.. A small population of the potentially toxic dinoflagellate *Dinophysis acuminata* was present at BCS III. The chlorophyll *a* levels were at or above average in southern and south eastern Baltic, east and west of Gotland the levels were below average.

Om AlgAware

SMHI genomför ca en gång per månad expeditioner med U/F Argos i Östersjön och Västerhavet. Resultat baserade på mikroskopanalys av planktonprover samt klorofyllmätningar presenteras kortfattat i denna rapport. Information från SMHI:s satellitövervakning av algblomningar finns på www.smhi.se.

About AlgAware

SMHI carries out monthly cruises with R/V Argos in the Baltic and the Kattegat/Skagerrak. Results from microscopic analysis of phytoplankton samples as well as chlorophyll measurements are presented in brief in this report. Information from SMHI:s satellite monitoring of algal blooms is found on www.smhi.se.

Art / Species	Gift / Toxin	Eventuella symptom	Clinical symptoms
Alexandrium spp.	Paralytic shellfish poisoning (PSP)	**Milda symptom:** Inom 30 min.: Stickningar eller en känsla av bedövning runt läpparna, som sprids gradvis till ansiktet och nacken; stickningar i fingertoppar och tår; Huvudvärk; yrsel, illamående, kräkningar, diarré **Extrema symptom:** Muskelförlamning; andningssvårigheter; känsla av att kvävas; Man kan vara död inom 2-24 timmar efter att ha fått i sig giftet, på grund av att andningsmuskulaturen förlamas.	**Mild case:** Within 30 min: tingling sensation ro numbness around lips, gradually spreading to face and neck; prickly sensation in fingertips and toes; headake, dizziness, nausea, vomiting, diarrhoea. **Extreme case** Muscular paralysis; pronounced respiratory difficulty; choking sensation; death trough respiratory paralysis may occur within 2-24 hours after ingestion.
Dinophysis spp.	Diarrehetic shellfish poisoning (DSP)	**Milda symptom:** Efter cirka 30 minuter till några timmar: yrsel, illamående, kräkningar, diarré, magont **Extrema symptom:** Upprepad exponering kan orsaka cancer	**Mild case:** Within 30 min-a few hours: dizziness, nausea, vomiting, diarrhoea, abdominal pain. **Extreme case:** Repeated exposure may cause cancer.
Chattonella spp.	Fish toxin	**Låg celltäthet:** Ingen påverkan. **Hög celltäthet:** Fiskens gälar skadas, fisken dör.	**Low cell numbers:** No effect on fish. **High cell numbers:** Fish death due to gill damage.
Pseudo- niztschia spp.	Amnesic shellfish poisoning (ASP)	**Milda symptom:** Efter 3-5 timmar: yrsel, illamående, kräkningar, diarré, magkramper **Extrema symptom:** Yrsel, hallucinationationer, förvirring, förlust av korttidsminnet, kramper	**Mild case:** Within 3-5 hours: dizziness, nausea, vomiting, diarrhoea, abdominal cramps. **Extreme case:** dizziness, hallucinations, confusion, loss of memory, cramps.

Översikt av potentiellt skadliga alger och det aktuella giftets effekt. Overview of potentially harmful algae and effects of toxins. Manual on harmful marine microalgae (2003 - UNESCO Publishing).

Kartan på framsidan visar viktat medelvärde för klorofyll *a,* µg/l (0-20 m) vid de olika stationerna. Förekomst av skadliga alger vid stationer där arter analyseras markeras med symbol.

The map on the front page shows weighted mean of chlorophyll *a*, µg/l (0-20 m) at sampling stations. Presence of harmful algae at stations where species analysis is performed is shown with a symbol

The Skagerrak

Å17 21st of May 2007 (outer Skagerrak)

A very poor plankton flora was revealed, of which half of the species observed are either heterotrophic or mixotrophic. This is a typical after spring bloom situation and occurs when the nutrients have been depleted.

Släggö 21st of May 2007 (inner Skagerrak)

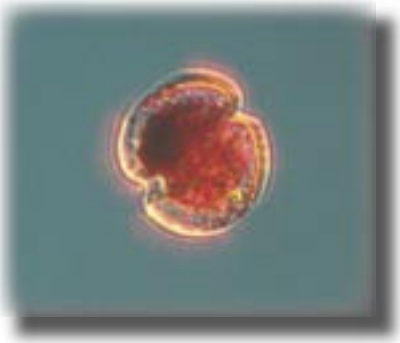
Skeletonema costatum

Low numbers of diatoms and dinoflagellates were observed, as well as low chlorophyll *a* values. The species with the highest cell numbers was the diatom *Skeletonema costatum*, probably a rudiment from the spring bloom. Cryptomonads, small flagellated species, were rather common.

The Kattegat

Anholt E 22nd and 25th of May 2007

As in the Skagerrak areas, the plankton flora was poor even in the Kattegat area. More or less the same species were found at the two occasions, a few more were found on the 22nd though. The species that were found in relatively high numbers were all small, i.e. cryptomonads, the dinoflagellate *Karlodinium micrum*, and *Leucocryptos marina*, which however does not belong to any taxonomical group (incertae sedis taxa).



Karlodinium micrum

Selection of observed species	Å17	Släggö	Anholt E	Anholt E
Red=potentially toxic species	2007-05-21	2007-05-21	2007-05-22	2007-05-25
	cells/L	cells/L	cells/L	cell/L
Apedinella radians	present			
Chaetoceros curvisetus		present		
Coscinodiscus spp.			present	
Dactyliosolen fragilissimus			present	present
Pseudo-nitzschia delicatissima-group		present		
Skeletonema costatum		200 000	present	
Thalassionema nitzschioides			present	present
Ceratium longipes		present	present	
Dinophysis norvegica		present	present	
Heterocapsa rotundata				present
Heterocapsa triquetra		present		
Karlodinium micrum	present	present	20 000	present
Peridiniella danica		present	present	15 000
Prorocentrum minimum		present		
Protoperidinium bipes	present	present		
Protoperidinium depressum	present		present	
Chattonella cf. *verruculosa*		present		
Cryptomonadales spp.	50 000	100 000	100 000	200 000
Plagioselmis prolonga	present	10 000	50 000	90 000
Chrysochromulina sp.		present	present	12 000
Pyramimonas sp.			12 000	9000
Leucocryptos marina	12 000	present	100 000	130 000
Choanoflagellates_colony	13 000		present	
Mesodinium rubrum		present	present	
Strombidium spp.	10 000	present	present	present

The Baltic Sea

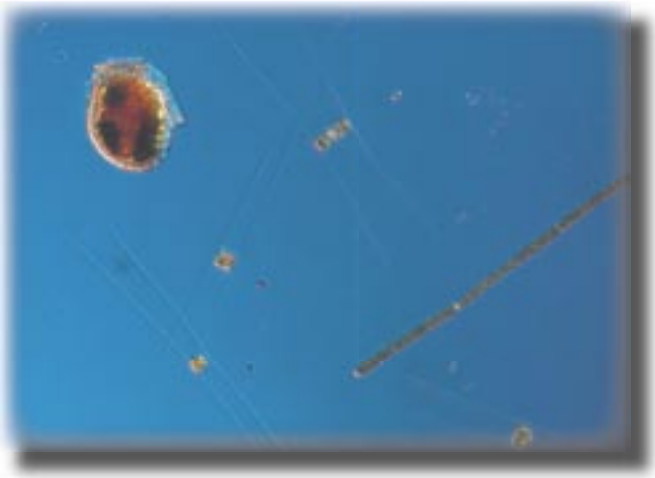
Arkona Basin BY2 22nd of May 2007 and Bornholm basin BY5 23rd of May 2007

Calliacantha natans

The species composition was almost identical at the two stations and was dominated by small species. *Chrysochromulina* spp., a small flagellate which is known to be lethal to fish was quite common, as was unidentified thekate dinoflagellates. The choanoflagellate *Calliacantha natans* was observed at both stations and was rather numerous in the Arkona basin. A few cyanobacteria filaments were present. Chlorophyll *a* values were at average.

The South East Baltic BCS III-10 23rd of May 2007

Dinoflagellates dominated the sample, the most common being naked dinoflagellates and the potentially toxic species *Dinophysis acuminata* which was found in numbers high above its critical limits.The diatom *Chaetoceros similis* and the prasinophyceae *Pterosperma* sp. were common as were cyanobacteria filaments, most of which was the genus *Aphanizomenon* spp. The chlorophyll *a* content was above average.



D. acuminata (high left), *C. similis* (middle) and *Aphanizomenon* (right).

Eastern Gotland Basin BY15 24th of May 2007

The chlorophyll *a* value was slightly below average and the species composition somewhat different as compared to the previous station. The most abundant species was *Chrysochromulina* spp. and other common species were also small ones. *D. acuminata* was found above its limits, but a lot less numerous as compared to the south east Baltic. The small thekate dinoflagellate (ca 8-10 µm) *Heterocapsa rotundata* was common and *Peridiniella catenata* was present. Threads of cyanobacteria, mostly *Aphanizomenon* spp. were observed.

Western Gotland Basin B38 24th of May 2007

Chrysochromulina sp. and *Pterosperma* sp.

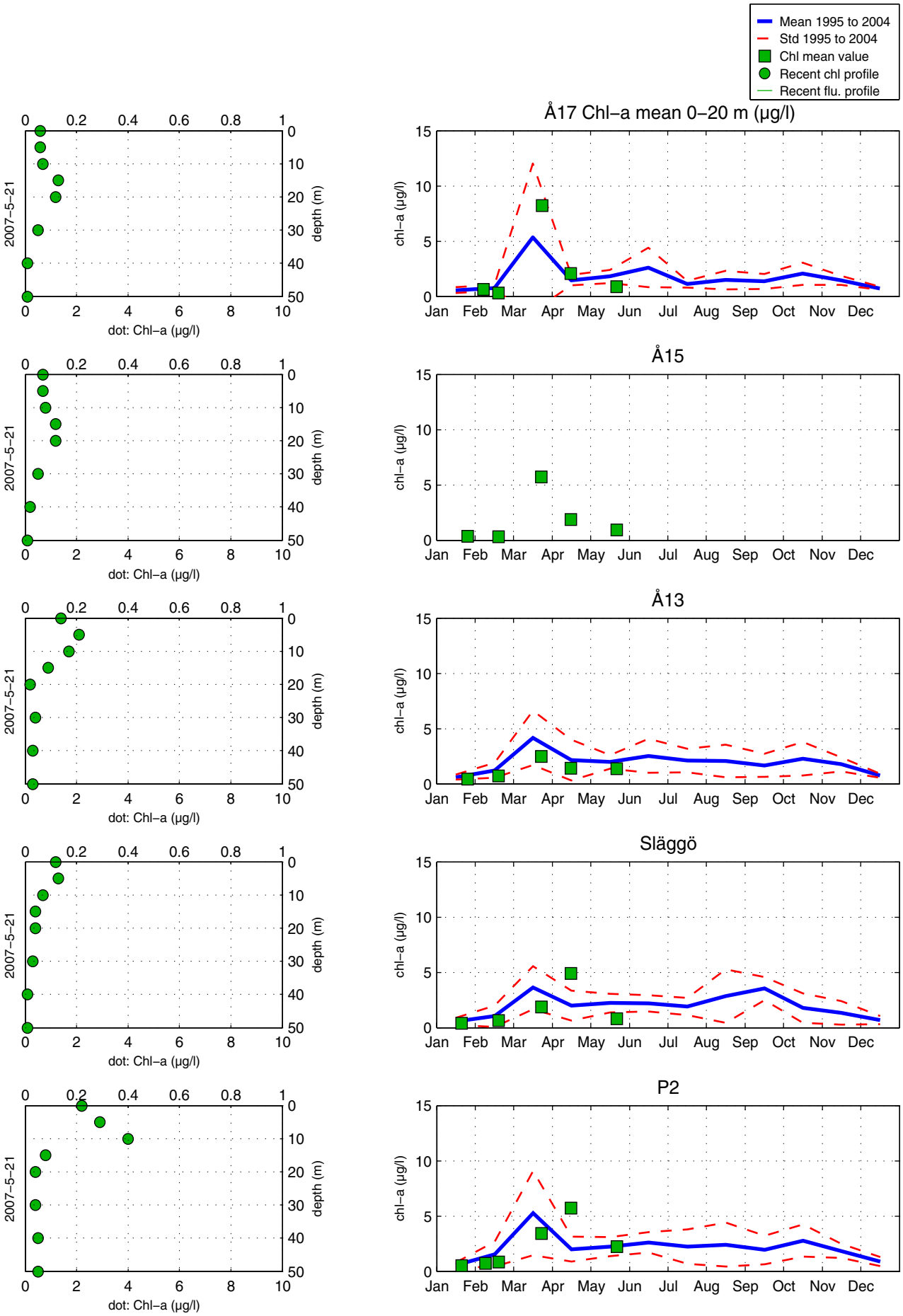
Cyanobacteria filaments, were common along with small cryptomonads, the dinoflagellate *H. rotundata*, the prasinophyceae *Pterosperma* spp. and the choanoflagellate *Calliacantha longicaudata*. The most abundant though, was *Chrysochromulina* spp.. Although the total count of autotrophic cells almost reached 500 000/l, the fact that the species are so small explains why the chlorophyll *a* content was quite low.

Selection of observed species Red=potentially toxic species [1] quantified in m/L	BY2 2007-05-22 cells/L	BY5 2007-05-23 cells/L	BCS III 10 2007-05-23 cells/L	BY15 2007-05-24 cells/L	BY38 2007-05-24 cells/L
Chaetoceros similis			150 000	present	
Pterosperma spp.			40 000		30 000
Dinophysis acuminata		present	20 000	3 700	1 500
Dinophysis norvegica			present	present	present
Dinophysis rotundata				present	
Gymnodiniales spp.	100 000	40 000	25 000	30 000	80 000
Heterocapsa rotundata				20 000	20 000
Heterocapsa triquetra	present				present
Katodinium glaucum	present	2 000	present	present	present
Peridiniales spp.	present	20 000	present	12 000	14 000
Peridiniella catenata		present	present	present	
Chrysochromulina spp.	90 000	170 000	20 000	115 000	130 000
Cryptomonadales spp.			present	present	present
Dinobryon balticum				10 000	
Pyramimonas spp.	present	present	present	30 000	32 000
Aphanizomenon sp.[1]	present	present	present	present	present
Calliacantha longicaudata	present		present	18 000	25 000
Calliacantha natans	30 000	present	present		present
Mesodinium rubrum	present	present	25 000	present	12 000
Strombidium spp.	present		present	present	present

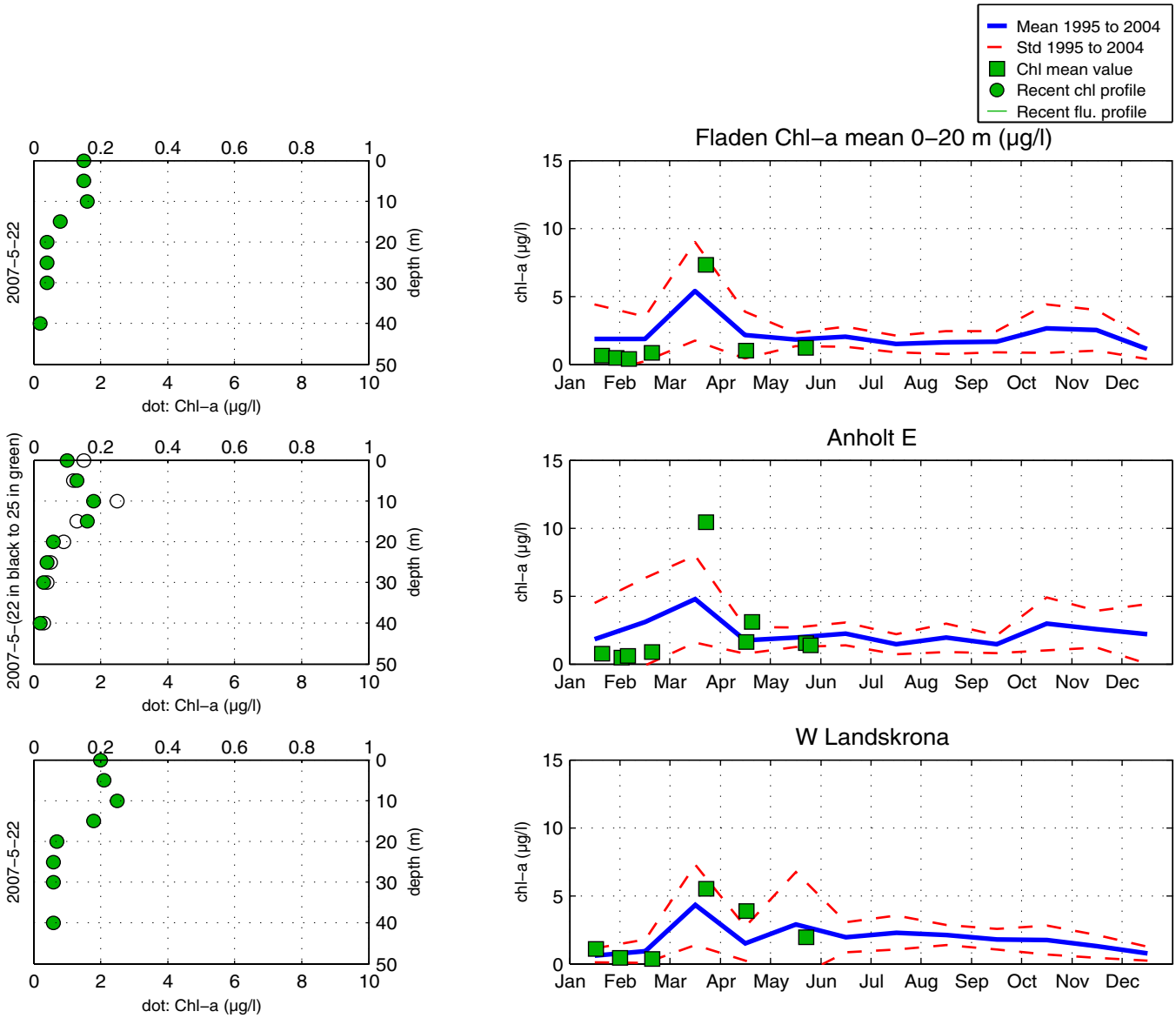
Phytoplankton analysis and text by Ann-Turi Skjevik.

Reviewed by Lars Edler.

The Skagerrak



The Kattegat and the Sound



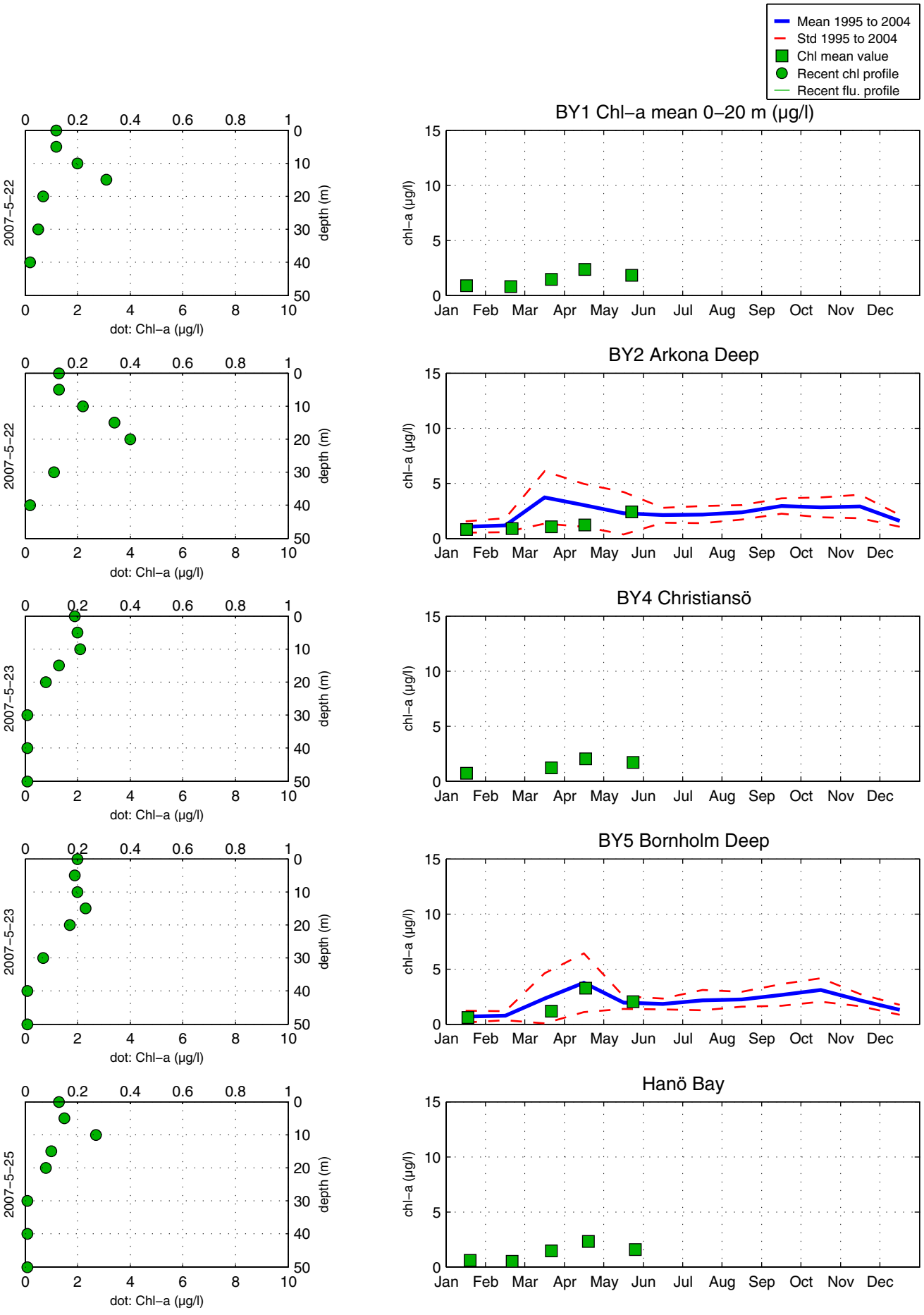
Om klorofylldiagrammen

Klorofyll *a* är ett mått på mängden växtplankton. Prover tas från ett antal djup från U/F Argos. Data presenteras både från de fasta djupen och som medelvärden 0-20 m. Utöver resultaten från laboratorieanalyserna av vattenprover mäts klorofyll *a* som fluorescens från ett automatiskt instrument som sänks ned från fartyget. På så sätt kan djupt liggande, ibland, tunna alger av växtplankton observeras.

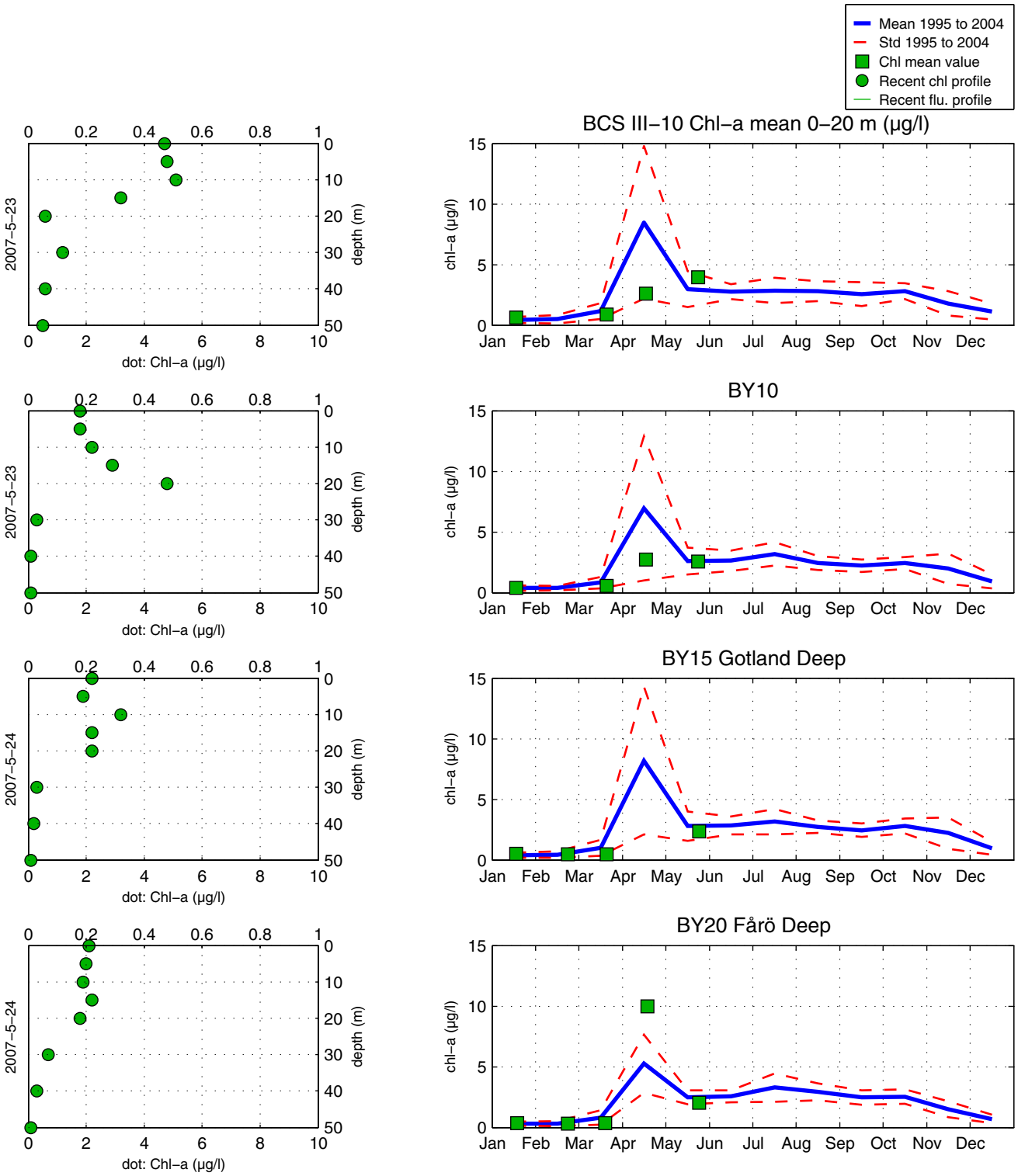
About the chlorophyll graphs

Chlorophyll *a* is sampled from several depths from the R/V Argos. Data is presented both from the discrete depths and as an average 0-20 m. In addition to the laboratory analysis from the water samples chlorophyll fluorescence is measured in continuous depth profiles from the ship. This is a way to observe thin layes of phytoplankton occuring below the surface.

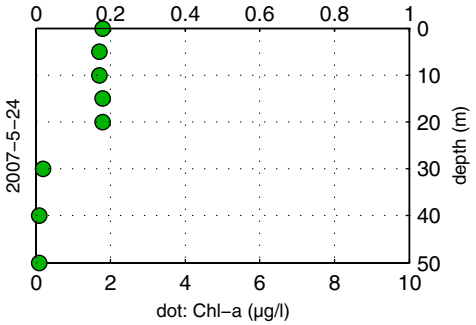
The Southern Baltic

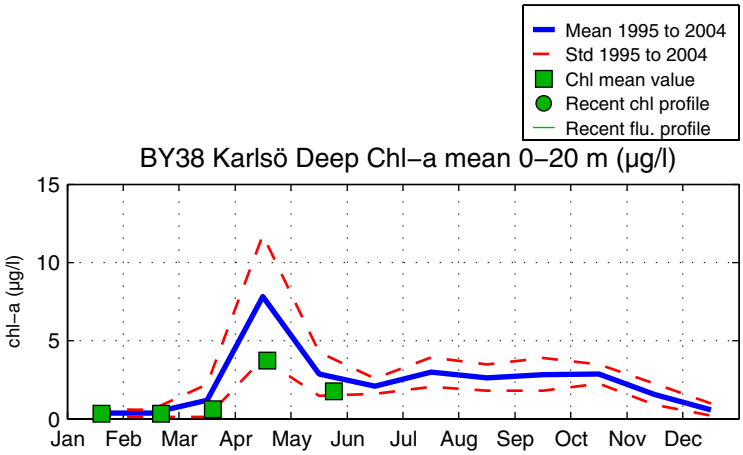


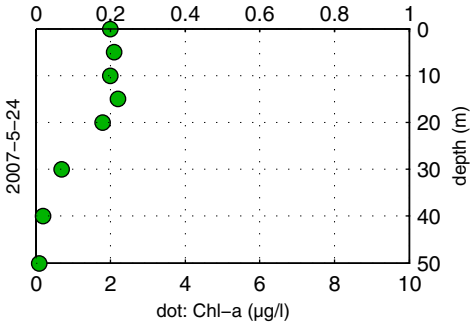
The Eastern Baltic

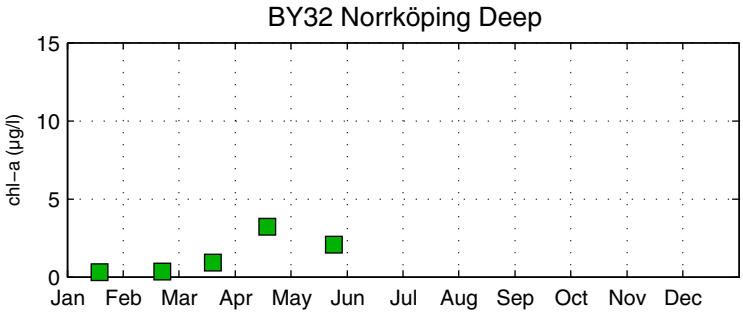


The Western Baltic









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