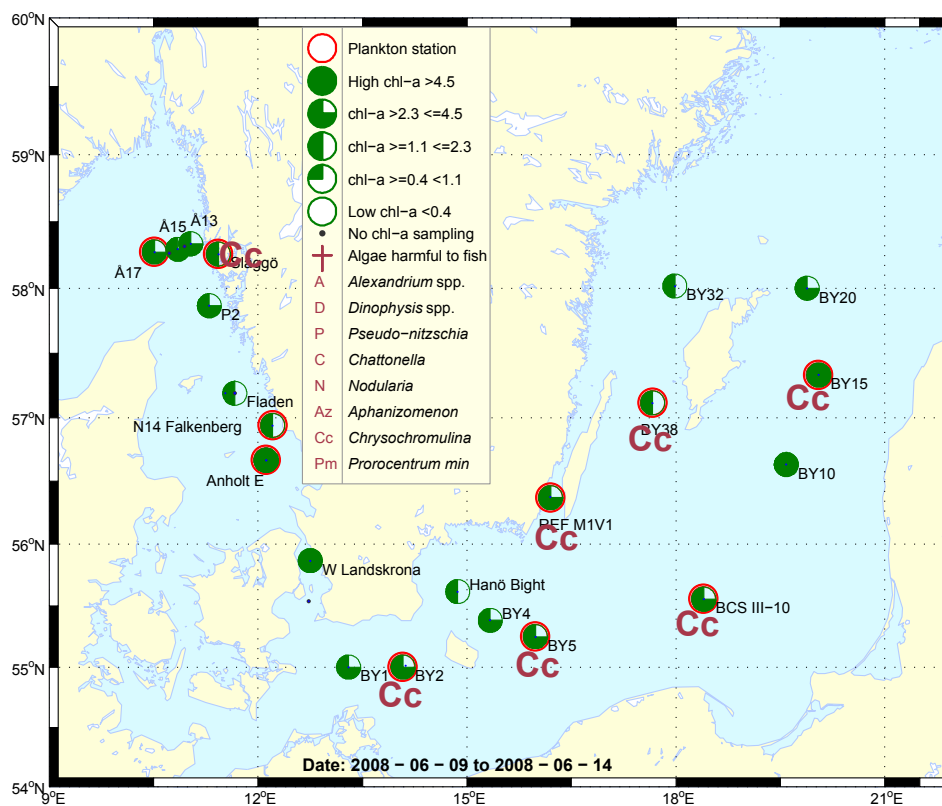


Sammanfattning

Höga fluorescens maxima observerades vid stationerna Å15 och Å17 i yttre Skagerrak och mångfalden av växtplankton var stor för detta område. Både vid Å17 och vid kuststationen Släggö, dominerade kiselalger. I Kattegatt var den filamentösa cyanobakterien *Anabaena* spp. vanlig, klorofyllhalterna var över det normala för månaden vid Anholt E och West Landskrona.

I Östersjön förekom fortfarande den stora (10-19 µm) *Chrysochromulina* sp. som varit mycket talrik sen oktober. Även mindre *Chrysochromulina* spp. var talrika, som förra månaden. Högst antal återfanns vid BY15, där också klorofyll *a* halterna var höga för månaden. De filamentösa cyanobakterierna *Anabaena* spp. och *Aphanizomenon* spp. observerades vid alla stationer, *Nodularia spumigena* fanns vid BY5, BY15 och BY38. Klorofyll *a* halterna var förhöjda framför allt i östra Östersjön.



Abstract

High fluorescence peaks were observed at stations Å15 and Å17 in the open Skagerrak, and the phytoplankton diversity was high for this area. At both Å17 and Släggö diatoms dominated the samples. In the Kattegat, the filamentous cyanobacterium *Anabaena* spp. was common. The chlorophyll *a* concentrations were above average for this month at Anholt E and West Landskrona.

In the Baltic, the large (10-19 µm) *Chrysochromulina* sp. that has been so abundant since October was still found at all stations, though far below the cell numbers in May. The small *Chrysochromulina* species was also still abundant in the samples from June. The highest cell numbers were found at BY15, and the chlorophyll *a* concentrations were also very high at this station. The filamentous cyanobacteria *Anabaena* spp. and *Aphanizomenon* spp. were observed at all Baltic stations, and *Nodularia spumigena* was found at BY5, BY15 and at BY38. The chlorophyll *a* concentrations were above average in the Eastern Baltic.

Om AlgAware

SMHI genomför ca en gång per månad expeditioner med U/F Argos i Östersjön och Västerhavet. Resultat baserade på semikvantitativ mikroskopanalys av planktonprover samt klorofyllmätningar presenteras kortfattat i denna rapport. Information från SMHI:s satellitövervakning av algbloomningar 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 semi quantitative 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
<i>Alexandrium</i> 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 or numbness around lips, gradually spreading to face and neck; prickly sensation in fingertips and toes; headache, dizziness, nausea, vomiting, diarrhoea. Extreme case Muscular paralysis; pronounced respiratory difficulty; choking sensation; death through respiratory paralysis may occur within 2-24 hours after ingestion.
<i>Dinophysis</i> spp.	Diarrhetic 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.
<i>Chattonella</i> 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.
<i>Pseudo-nitzschia</i> spp.	Amnesic shellfish poisoning (ASP)	Milda symptom: Efter 3-5 timmar: yrsel, illamående, kräkningar, diarré, magkramper Extrema symptom: Yrsel, hallucinationer, 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. Då cirkeln är tom innebär detta att stationen inte provtagits.

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. An empty circle indicates that there has been no sampling at that station.

More detailed information on species composition and abundance

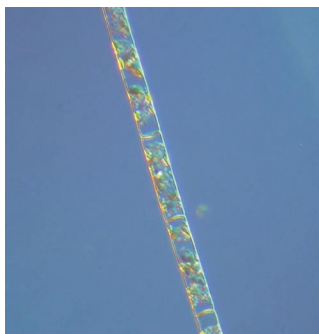
The Skagerrak

Å17 9th of June 2008 (open Skagerrak)

The phytoplankton diversity was high for this station. Diatoms dominated and the most abundant species were the potentially toxic *Pseudo-nitzschia delicatissima*-group and *Skeletonema costatum*. The dinoflagellate with the highest cell numbers was the small species *Karlodinium micrum* (13-20 µm). The filamentous cyanobacterium *Anabaena* spp. was common.

A fluorescence peak was observed at about 25 meters depth, and correlated well with the measured chlorophyll *a*, the values being high at 20 and 30 meters. The mean chlorophyll *a* value was still at average because of the low concentrations closer to the surface.

Släggö 9th of June 2008 (Skagerrak coast)



Leptocylindrus danicus

Diatoms dominated the phytoplankton sample and *Leptocylindrus danicus* was the most abundant diatom species. *Karlodinium micrum* was the most common dinoflagellate. The potentially toxic genus *Chrysochromulina* was present, and the small flagellate *Leucocryptos marina* was very common, as were small cryptomonads. Some cyanobacteria filaments were observed.

The chlorophyll *a* concentrations were low, but at average for this month.

The Kattegat

N14 Falkenberg 10th of June 2008

Proboscia alata and *Phaeodactylum tricornerutum* were the most common diatoms, but the small flagellate *Leucocryptos marina* was the most numerous species in the sample. The filamentous cyanobacterium *Anabaena* spp. and the dinoflagellate *K. micrum* were common.



Leucocryptos marina

Anholt E 10th and 14th of June 2008

The results differed between the two occasions. On the first visit, the number of species were fewer but the cell numbers were higher in comparison to the second visit. Also, on the first visit, the filamentous cyanobacterium *Anabaena* spp. was the most numerous plankton, *K. micrum* being second most numerous. On the second visit however, the sample was more Skagerrak like with diatoms dominating. The most common diatoms were *Pseudo-nitzschia* spp., *Skeletonema costatum* and *Leptocylindrus danicus*. The dinoflagellate *K. micrum* was still common, but at less than half the amount of the first visit.

The chlorophyll *a* concentrations were above average on both occasions, but more so on the first visit. This fits well with the higher amount of cell numbers on the first occasion.

Selection of observed species	Å17	Släggö	N14	Anholt E	Anholt E
Red=potentially toxic species	2008-06-09	2008-06-09	2008-06-10	2008-06-10	2008-06-14
	cells/l	cells/l	cells/l	cells/l	cells/l
<i>Cerataulina pelagica</i>	present	24 000	present		present
<i>Chaetoceros danicus</i>	present		present	present	present
<i>Chaetoceros debilis</i>		present			present
<i>Chaetoceros decipiens</i>				present	
<i>Chaetoceros laciniosus</i>					present
<i>Chaetoceros socialis</i>		present			
<i>Cylindrotheca closterium</i>	present	27 000	present		present
<i>Dactyliosolen fragilissimus</i>	present			present	present
<i>Guinardia delicatula</i>			present		present
<i>Leptocylindrus danicus</i>	present	56 000			35 000
<i>Phaeodactylum tricornutum</i>	present	present	present	present	present
<i>Proboscia alata</i>	25 000	present	26 000	32 000	present
<i>Pseudo-nitzschia delicatissima</i> -group	78 000	present		present	42 000
<i>Pseudo-nitzschia seriata</i> -group	present				
<i>Pseudo-nitzschia</i> spp.	33 000	32 000	present		74 000
<i>Skeletonema costatum</i> complex	44 000	present		present	58 000
<i>Thalassionema nitzschioides</i>	present	present	present	present	present
<i>Thalassiosira anguste-lineata</i>					present
<i>Thalassiosira angulata</i>					present
<i>Thalassiosira nordenskiöldii</i>					present
<i>Ceratium fusus</i>		present	present		
<i>Ceratium lineatum</i>		present			present
<i>Ceratium longipes</i>		present		present	
<i>Ceratium tripos</i>	present	present	present	present	present
<i>Dinophysis norvegica</i>		present			
<i>Gymnodinium verruculosum</i>	present				
<i>Heterocapsa triquetra</i>		present			present
<i>Karlodinium micrum</i>	25 000	present	present	81 000	present
<i>Peridiniella danica</i>	present	present	present	present	present
<i>Prorocentrum micans</i>		present			
<i>Protoceratium reticulatum</i>					present
<i>Scrippsiella</i> -complex					present
Cryptomonadales spp.	45 000	106 000	40 000	40 000	108 000
<i>Chrysochromulina</i> spp.	present	common	present	present	present
<i>Heterosigma akashiwo</i>		present	present		
<i>Dinobryon balticum</i>		present			
<i>Pseudopedinella</i> spp.		present			present
<i>Pyramimonas</i> spp.					present
<i>Quadricoccus euryhalinicus</i>	present				present
<i>Ebria tripartita</i>	present		present		
<i>Leucocryptos marina</i>	67 000	77 000	84 000	23 000	28 000
<i>Calliacantha natans</i>	present	present			
<i>Anabaena</i> spp.	common		common	common	present
<i>Mesodinium rubrum</i>		present			present
<i>Strombidium</i> spp.				present	

The Baltic Sea

Arkona Basin BY2 10th of June

Equal amounts of the two sizes of *Chrysochromulina* spp. dominated the sample. The prasinophyte *Pyramimonas* spp. was in a state of bloom, and cryptomonads were abundant. The filamentous cyanobacteria *Anabaena* spp. and *Aphanizomenon* spp. were both present. The diatom *Cyclotella chotawhatcheana* was common.

The chlorophyll *a* concentration was just above average for this month.

Bornholm Basin BY5, 11th of June.

The large *Chrysochromulina* sp. was almost twice as abundant as the small species, although the prasinophyte *Pyramimonas* spp. was the most common. Approximately equal amounts of the cyanobacteria *Anabaena* spp. and *Aphanizomenon* spp. were found, *Nodularia spumigena* was less common. The dinoflagellates *Dinophysis acuminata*, *D. norvegica* and *Amphidinium crassum* were present and diatoms were absent.

A fluorescence peak was observed between 25-30 meters. The chlorophyll *a* concentrations were above average for this month.

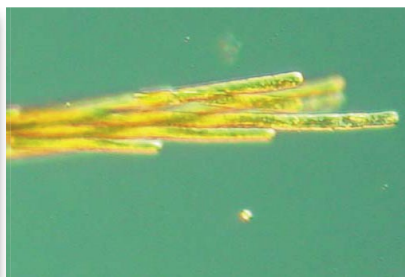
South East Baltic BCS III-10 11th of June

The cyanobacteria *Anabaena* spp. and *Aphanizomenon* spp. were found, the latter being the most common. Approximately equal cell numbers of the different *Chrysochromulina* species were quantified. The prasinophyte *Pyramimonas* spp. and the dinoflagellate cf. *Karlodinium micrum* were both very abundant. In addition to *K. micrum*, *Heterocapsa rotundata* and *H. triquetra*, the same dinoflagellates as at BY5 were also found.

The chlorophyll *a* concentration was just above average for this month.



Nodularia spumigena



Aphanizomenon spp.



Anabaena spp.

Eastern Gotland Basin BY15 12th of June

The cyanobacteria *Anabaena* spp. and *Aphanizomenon* spp. were found in equal amounts and were quite common. *Nodularia spumigena* was also present, but only with a few filaments. The small *Chrysochromulina* spp. was dominant, but the large species was also very abundant, as was the prasinophyte *Pyramimonas* spp..

The mean chlorophyll *a* concentration was well above average for this month, mainly due to elevated values between 10-20 meters.

Western Gotland Basin BY 38 13th of June

Chrysochromulina spp. cell numbers were very low, and unlike all other stations, the chlorophyll *a* concentration was at the lower end of average for this month. There was a conspicuous fluorescence peak at about 15 meters depth, but the chlorophyll *a* values were low. The cyanobacteria amounts were similar to those at BY15, only with less *Aphanizomenon* spp.

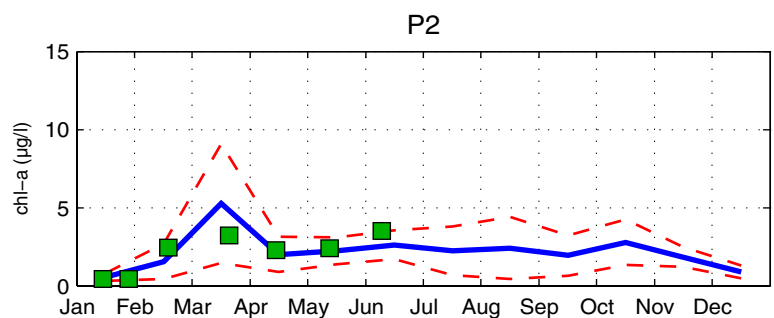
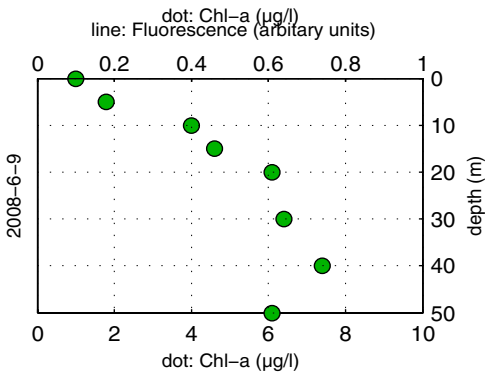
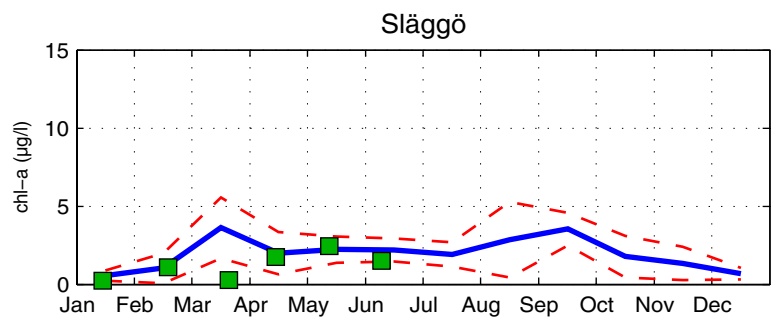
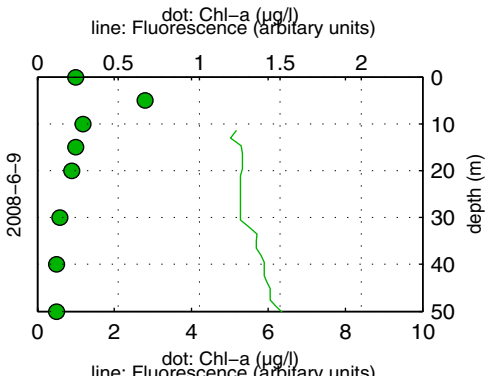
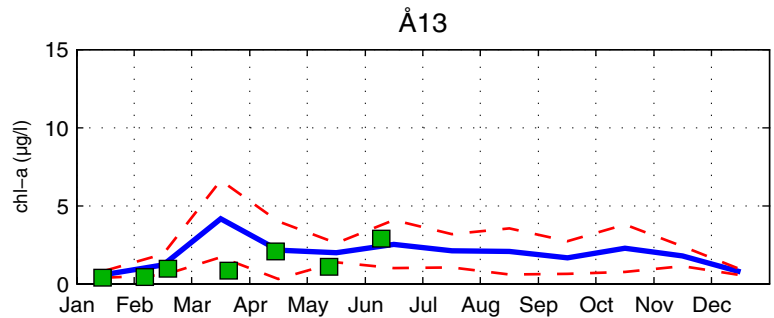
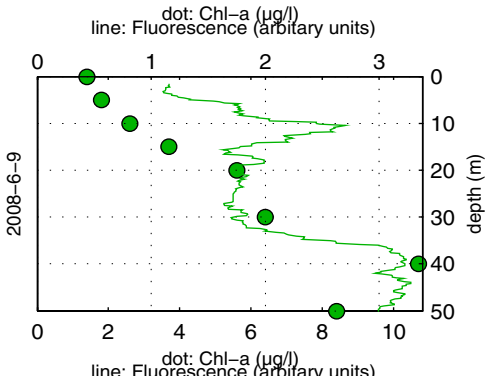
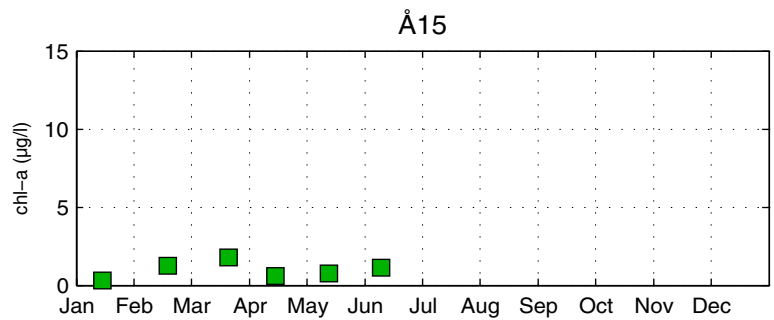
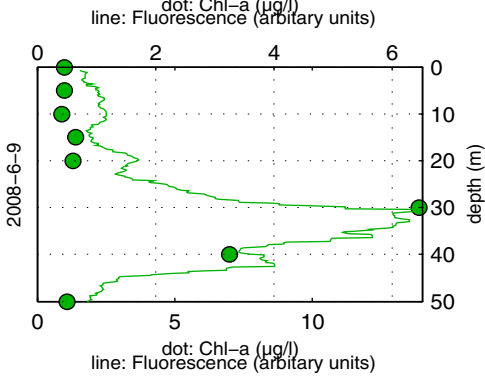
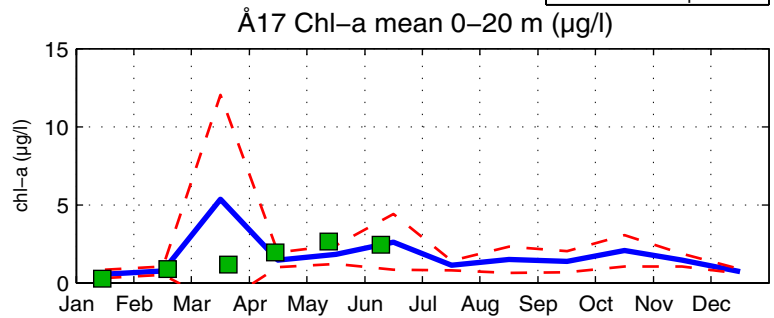
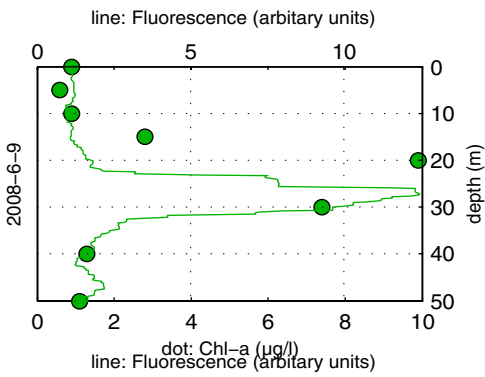
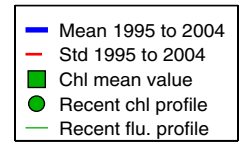
Kalmar Sound Ref. M1-V1 13th of June

The prasinophyte *Pyramimonas* spp. was found with the highest cell numbers. The small *Chrysochromulina* sp. was almost twice as common as the large species, and a few dinoflagellate species were present in low numbers. The cyanobacteria *Anabaena* spp. and *Aphanizomenon* spp. were found in equal amounts and were common.

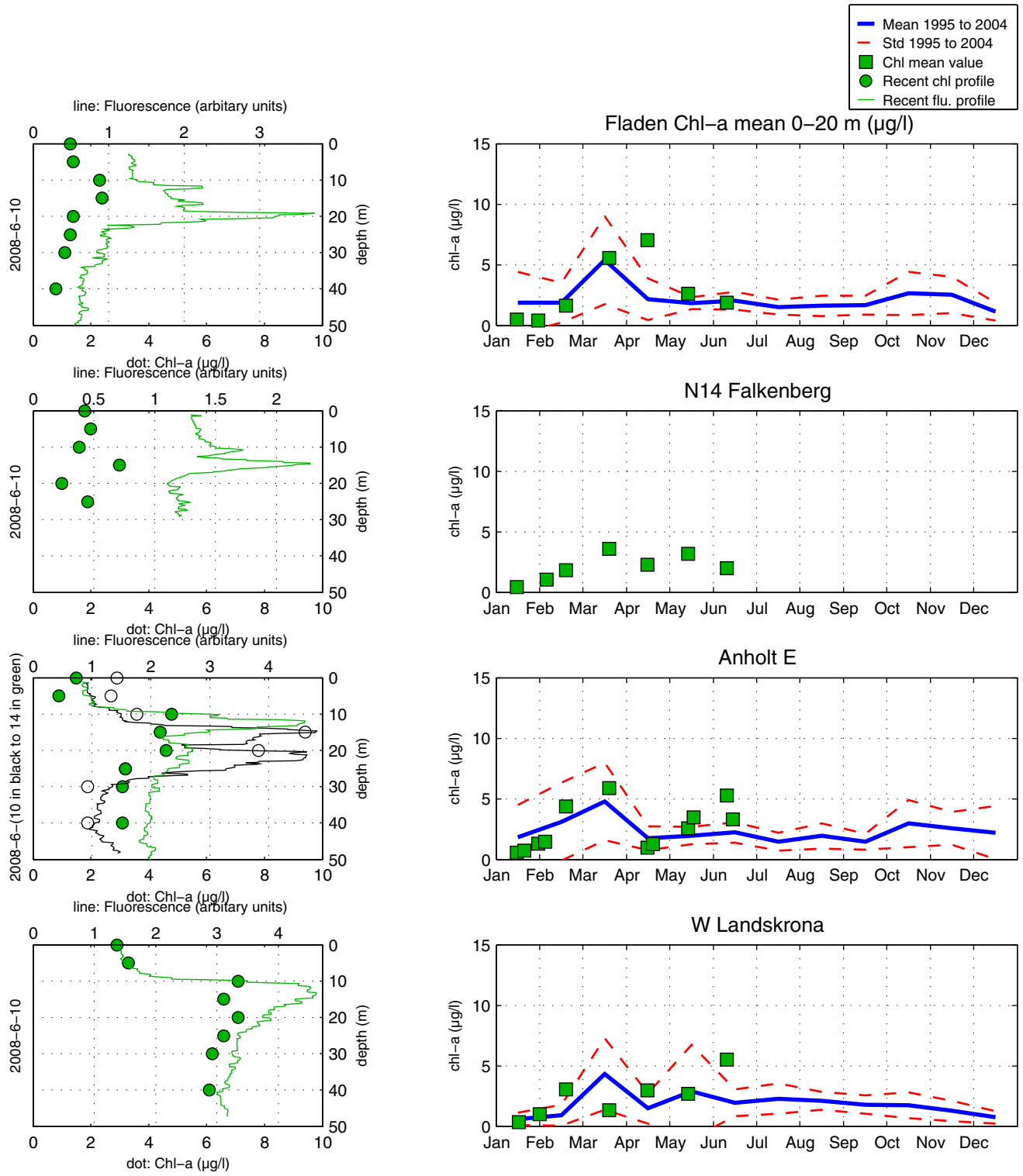
Phytoplankton analysis and text by: Ann-Turi Skjevik

Selection of observed species	BY2	BY5	BCS III-10	BY15	BY38	Ref. M1-V1
Red=potentially toxic species	2008-06-11	2008-06-11	2008-06-11	2008-06-12	2008-06-13	2008-06-13
¹ quantified in m/l	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l
<i>Chaetoceros thronsenii</i>	present					
<i>Cyclotella choctawhatcheana</i>	common					
<i>Skeletonema costatum</i> complex						present
<i>Amphidinium crassum</i>		present	present	present		present
<i>Amylax triacantha</i>			present			
<i>Cladopyxis claytonii</i>					present	
<i>Dinophysis acuminata</i>	present	present	present	present		present
<i>Dinophysis norvegica</i>		present	present	present		present
<i>Heterocapsa rotundata</i>			present	present	present	present
<i>Heterocapsa triquetra</i>			present			common
<i>Karlodinium micrum</i>			327 000	present	present	present
<i>Katodinium glaucum</i>				present		present
<i>Chrysochromulina</i> sp. (large)	600 000	400 000	260 000	970 000	present	370 000
<i>Chrysochromulina</i> spp. (small)	600 000	250 000	307 000	6.9 million	present	650 000
Cryptomonadales spp.	250 000	250 000	227 000	400 000	270 000	260 000
<i>Pyramimonas</i> spp.	450 000	780 000	356 000	940 000	496 000	860 000
<i>Dinobryon faculiferum</i>		present			present	
<i>Anabaena</i> spp.	present	present	present	common	common	common
<i>Aphanizomenon</i> spp.	present	present	present	common	common	common
<i>Nodularia spumigena</i>		present		present	present	
<i>Leucocryptos marina</i>	present				present	present
<i>Mesodinium rubrum</i>		present	present	present	present	present
<i>Strombidium</i> spp.		present		present	present	

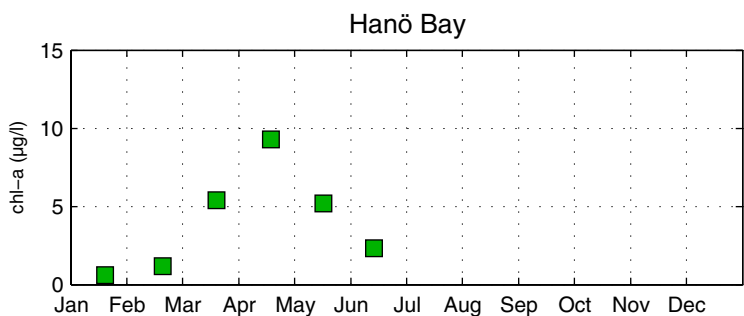
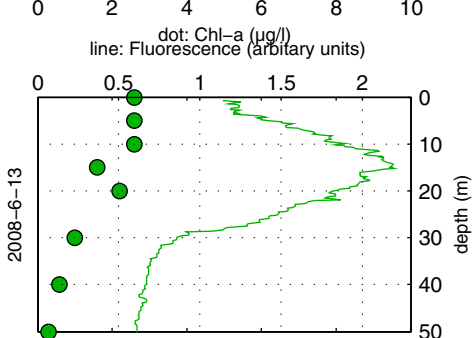
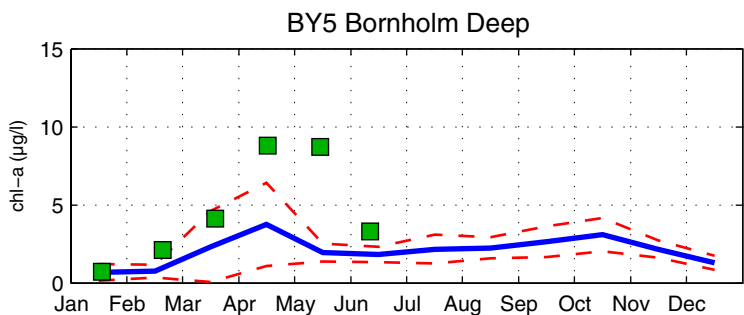
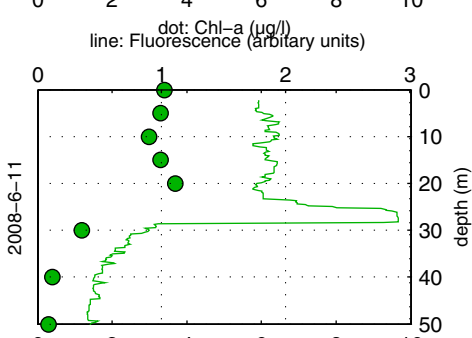
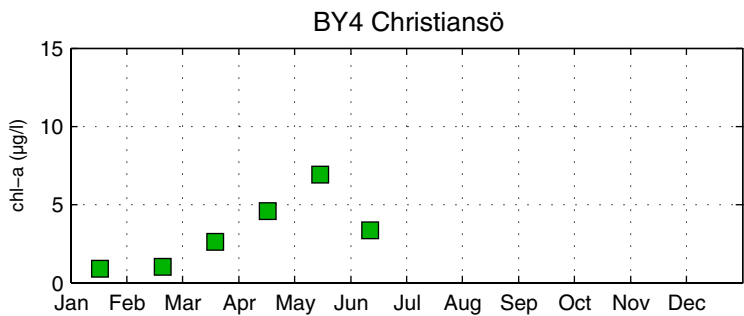
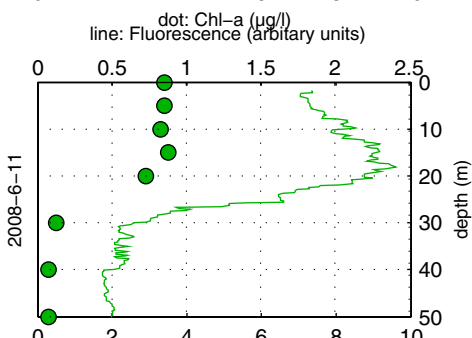
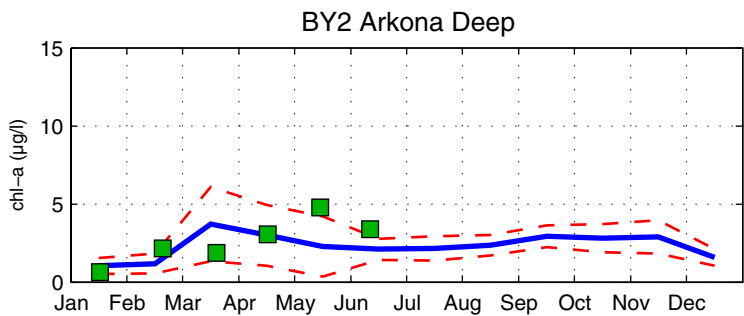
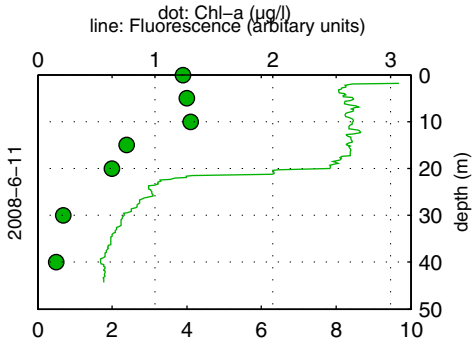
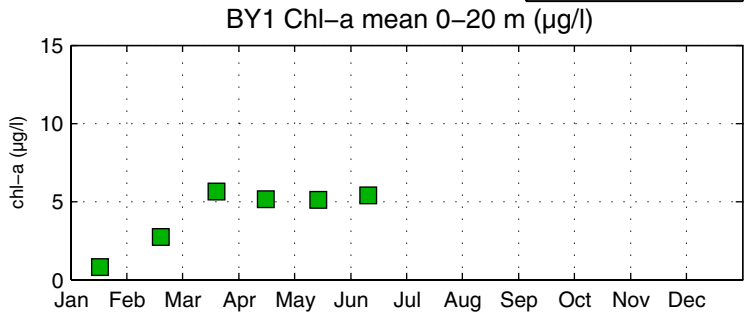
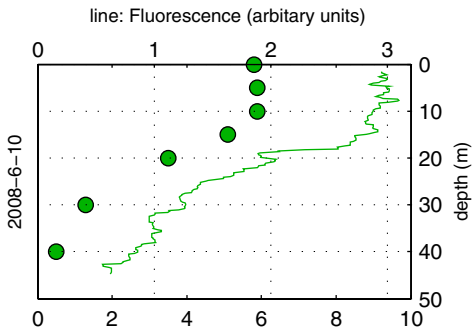
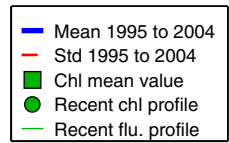
The Skagerrak



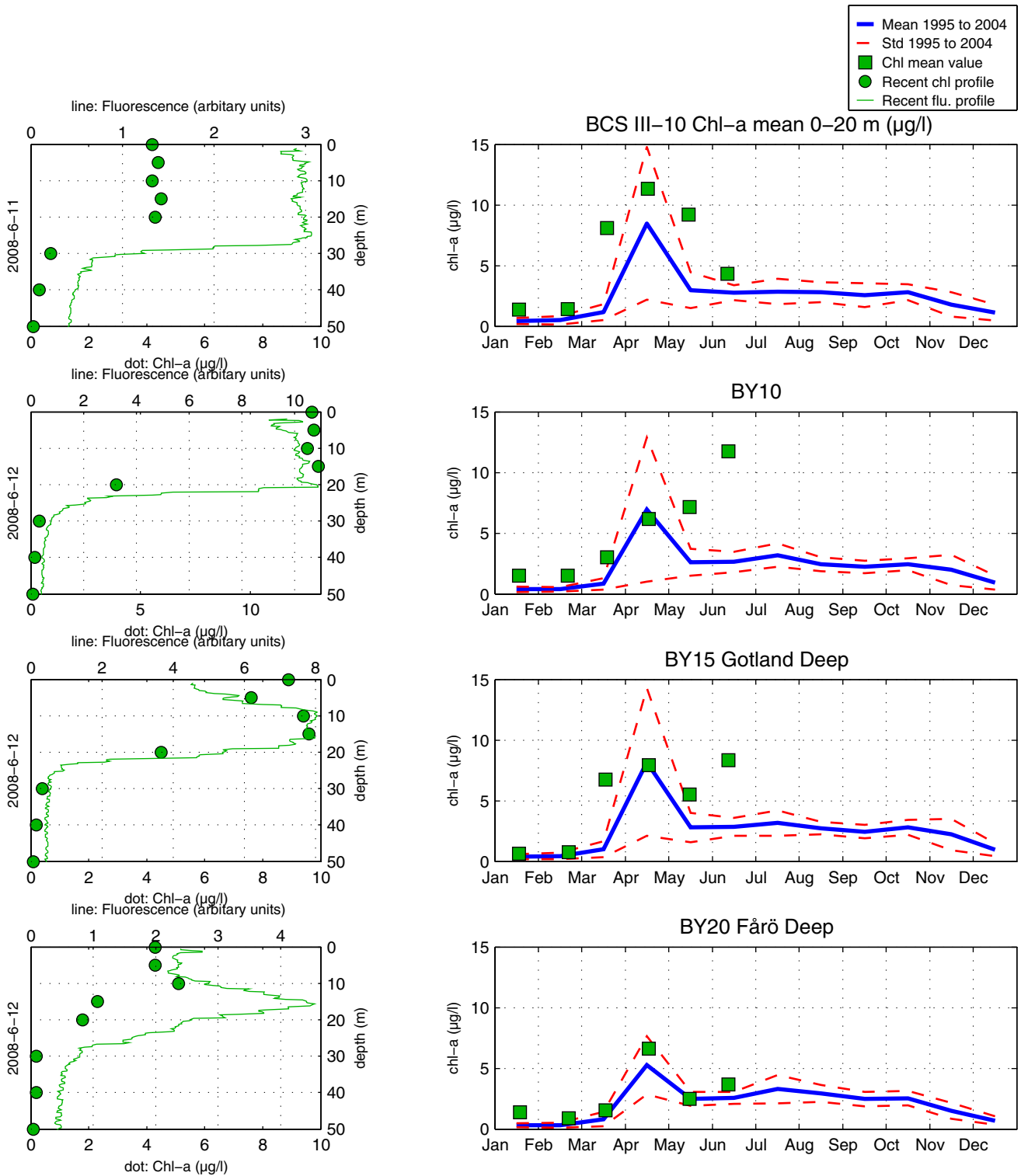
The Kattegat and the Sound



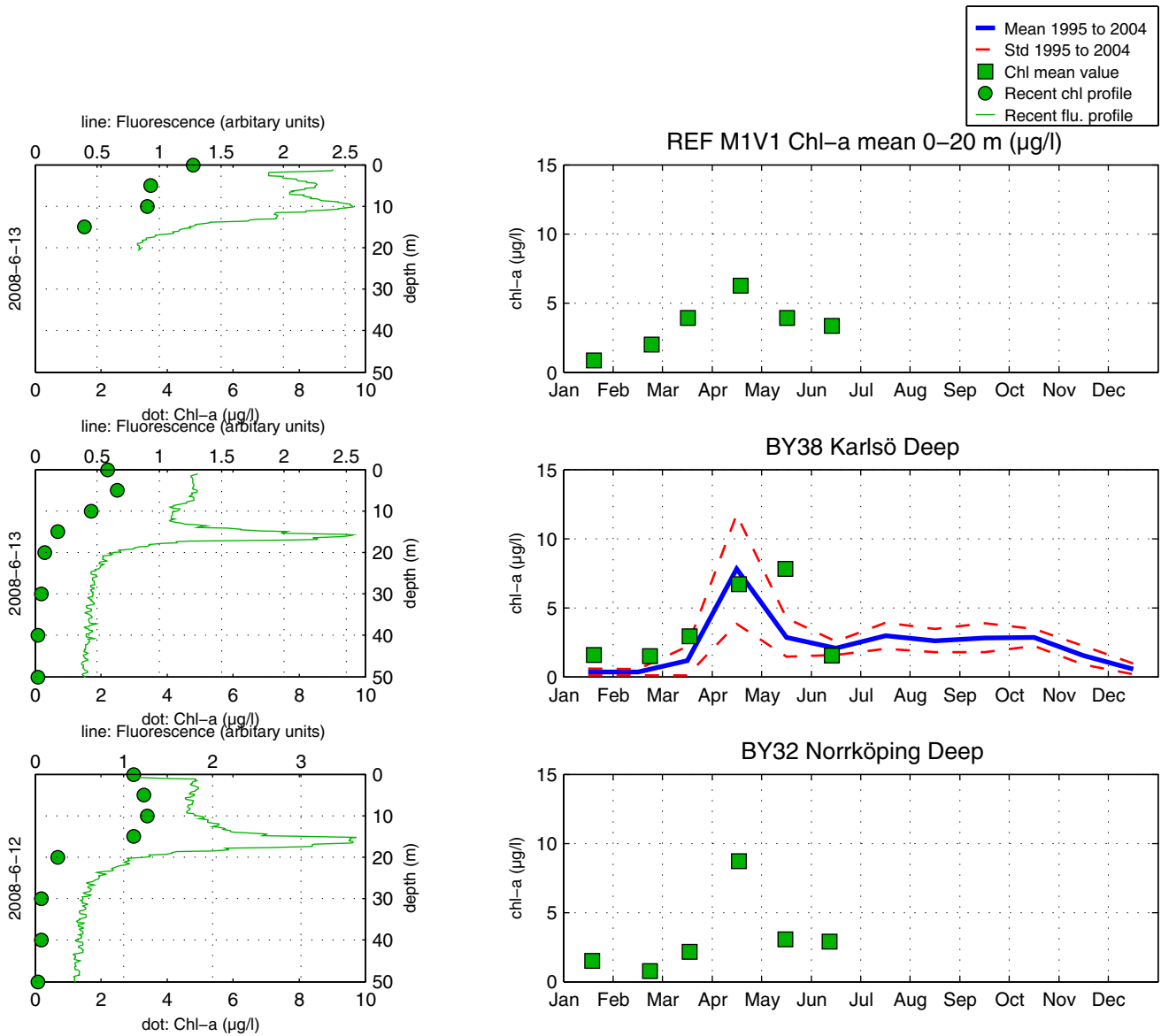
The Southern Baltic



The Eastern Baltic



The Western Baltic



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 lager 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 layers of phytoplankton occurring below the surface.

