SMHI
Oceanographic Unit
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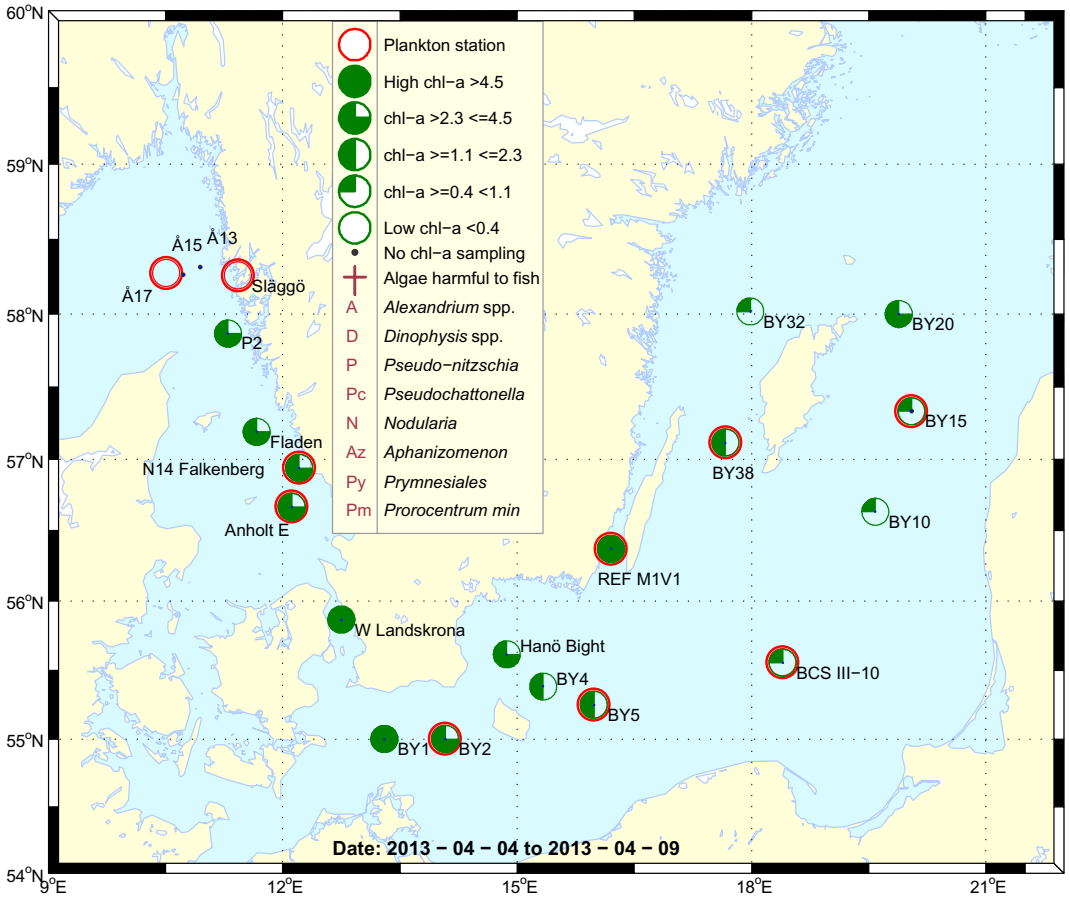
AlgAware
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Många typiska vårblomningsarter av kiselalger fanns i växtplanktonproverna från Västerhavet, men bara som en påminnelse om vad som varit. *Rhizosolenia hebetata* fanns i förhöjda cellantal vid de flesta stationerna och *Skeletonema marinoi* vid ett av besöken vid Anholt E. I övrigt var cellantalen av kiselalger låga. Det var nästan lika många arter av dinoflagellater som kiselalger, en stor del av dessa var heterotrofa arter. Flera heterotrofa mindre flagellater och ciliater observerades.

I Östersjön fanns vårblommande kiselalger framför allt i södra delen och i Kalmar sund. Kiselalger observerades vid samtliga stationer, men längre norrut i egentliga Östersjön var närsalterna fortfarande höga och cellantalen låga. Generellt sett så var små kolonibildande cyanobakterier vanligt förekommande, de filamentösa cyanobakterierna *Nodularia spumigena* och *Aphanizomenon flos-aque* fanns i mycket låga mängder.



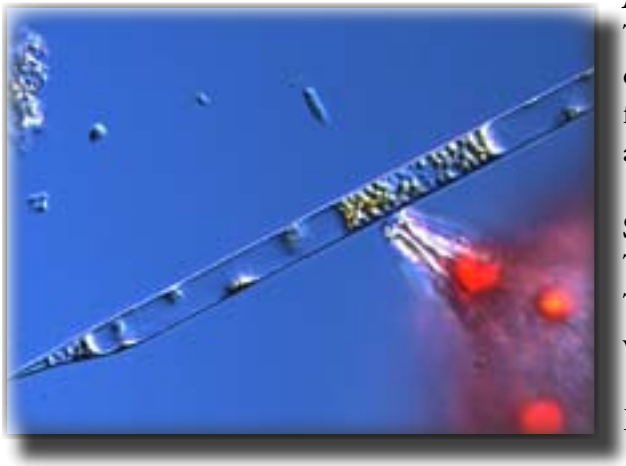
Abstract

Several spring bloom diatom species were present in the phytoplankton samples from the Skagerrak-Kattegat area, reminding us of the past bloom. The diatom *Rhizosolenia hebetata* was common at most stations and *Skeletonema marinoi* was common at one of the Anholt E visits. Cell counts were mostly low. The number of dinoflagellate species were almost the same as the number of diatom species, and many of them heterotrophic. Several heterotrophic small flagellates and ciliates were observed.

In the Baltic, the diatom spring bloom was found mainly in the southern parts and in the Kalmar sound. Diatoms were found at all of the Baltic stations, but in the northern parts of the Baltic Proper, nutrients were high and the cell counts were low. Generally speaking, colonies of small cyanobacteria were abundant and the filamentous cyanobacteria *Nodularia spumigena* och *Aphanizomenon flos-aque* were found in very low amounts.

More detailed information on species composition and abundance

The Skagerrak



The diatom *Rhizosolenia hebetata* was found in the Skagerrak and Kattegat samples.

Å17 (open Skagerrak) 6th of April
The phytoplankton diversity was low, and the most common diatom was *Rhizosolenia hebetata*. A few diatom species remained from the spring bloom, several heterotrophic dinoflagellates and other flagellated species were present.

Släggö (Skagerrak coast) 6th of April
The phytoplankton situation was very similar to the one at Å17. The total cell counts of diatoms were higher at Släggö and there were more heterotrophic species present at Å17.

Due to technical problems during analysis, chlorophyll results are missing from all of the Skagerrak stations except from P2.

The Kattegat

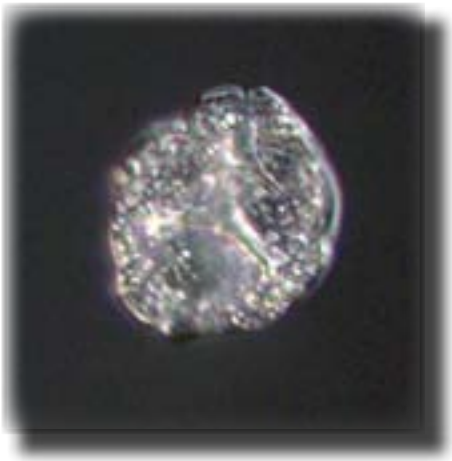
N14 Falkenberg 6th of April
The species diversity was rather high, but the cell numbers were low. The diatom *Rhizosolenia hebetata* was common

Anholt E 6th and 7th of April
The difference between the two sample occasions was quite big despite the short time span. Diurnal rhythm, i.e. the migration of phytoplankton up and down the water column might be the reason, considering that the first visit was in the middle of the night and the second was in the morning, about 30 hours later. Also, the wind picked up and the current was stronger at the second stop which could have caused the movement of phytoplankton richer surface water to this area.

At the first visit, *Rhizosolenia hebetata* was the most common diatom, at the second, *Skeletonema marinoi* was very common and *Detonula confervacea* was present with quite high cell numbers.

The integrated (0-20 m) chlorophyll *a* concentrations were within normal for this month in the Kattegat area. At all of the stations there were chlorophyll maxima at 15-20 meters, probably caused by sinking diatoms.

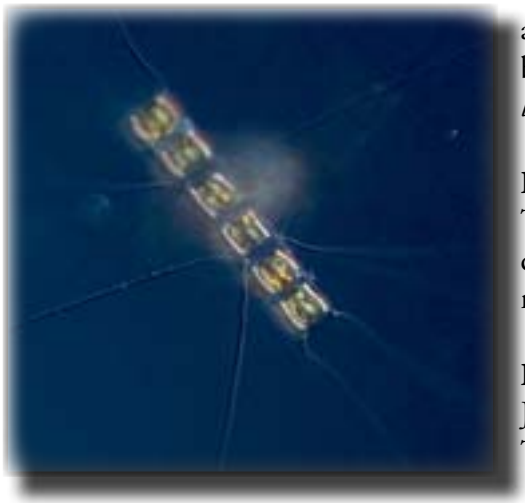
The diatom *Detonula confervacea* was abundant at the second visit at Anholt E.



The heterotrophic flagellate *Ebria tripartita* was present at all of the stations.

The Baltic Sea

BY2 Arkona and BY5 Bornholms Deep 7th and 8th of April



The diatom *Chaetoceros wighamii* was present at almost all of the Baltic phytoplankton stations.

The spring bloom had started with *Skeletonema marinoi* dominating amongst the diatoms. *Chaetoceros* species were abundant, *C. wighamii* being the most numerous. The diatoms *Thalassiosira* cf. *baltica* and *T.* cf. *levanderi* were very common at BY2 and present at BY5.

BCS III-10 and BY15 8th and 9th of April

The spring bloom was less evident than at BY2 and BY5, but several diatoms were present and *Skeletonema marinoi* had quite high cell numbers, suggesting that the bloom was heading east- and northwards.

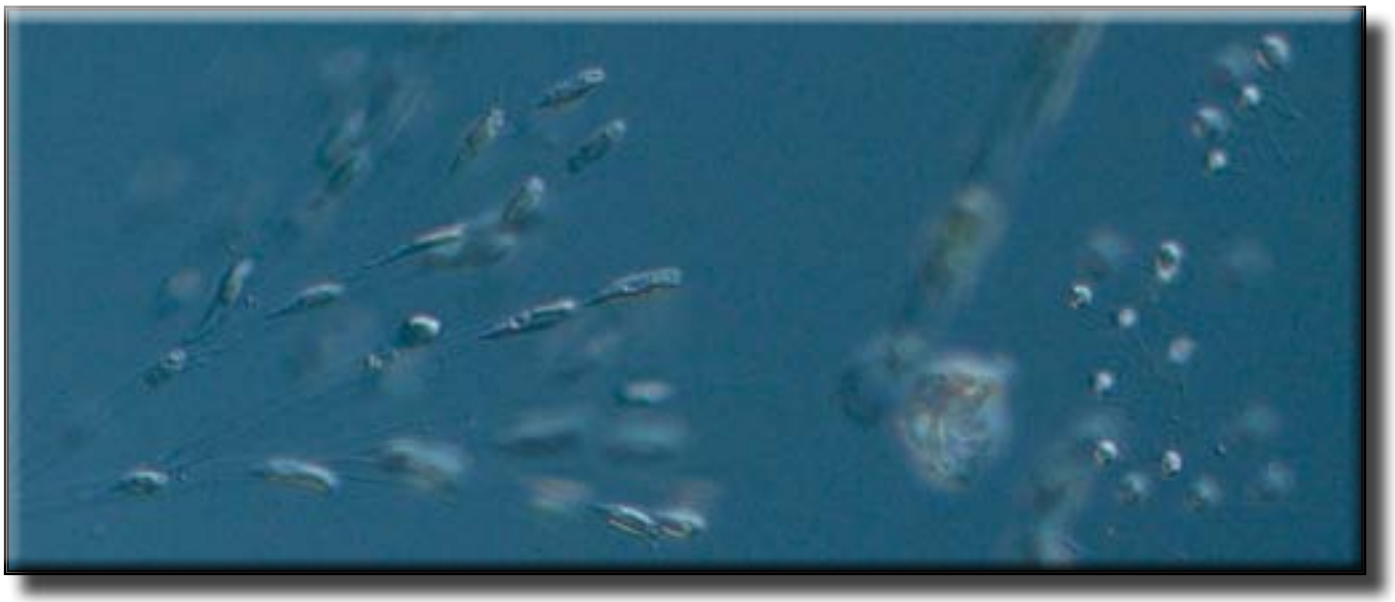
BY38 4th of April

Just a few species of diatoms were found in very low cell numbers. The dinoflagellates cf. *Scrippsiella hangoei* and *Heterocapsa* spp. were abundant. Dinoflagellate species were twice as many as at the other stations. Euglenophytes and small flagellates were common.

Ref M1V1 Kalmar Sound 5th of April

The diatom spring bloom had grown stronger since the previous expedition. *Skeletonema marinoi* dominated and *Melosira arctica*, *Achnanthes taeniata* and *Chaetoceros wighamii* were very common. Colonies of small cyanobacteria and of the heterotrophic group choanoflagellates were abundant.

High surface concentrations of chlorophyll *a* caused rather high integrated (0-20 m) concentrations at BY1 and Ref M1V1. Apart from the stations mentioned, the chlorophyll concentrations were moderate for this month, resulting in integrated values within average or just below normal (BY15).



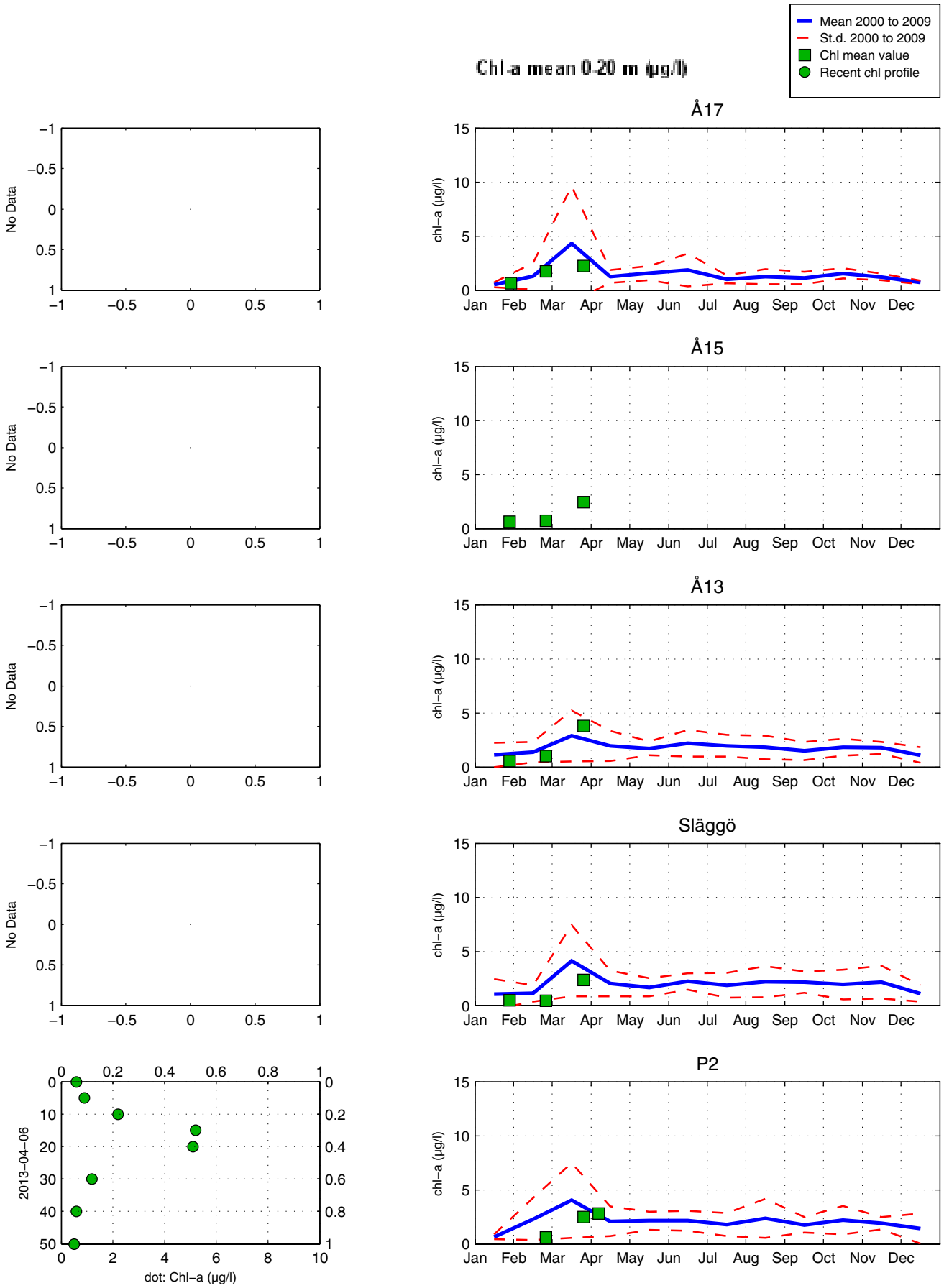
A colony of the mixotrophic species *Dinobryon balticum* to the left, a colony of heterotrophic choanoflagellates to the right.

Phytoplankton analysis and text by:
Ann-Turi Skjevik

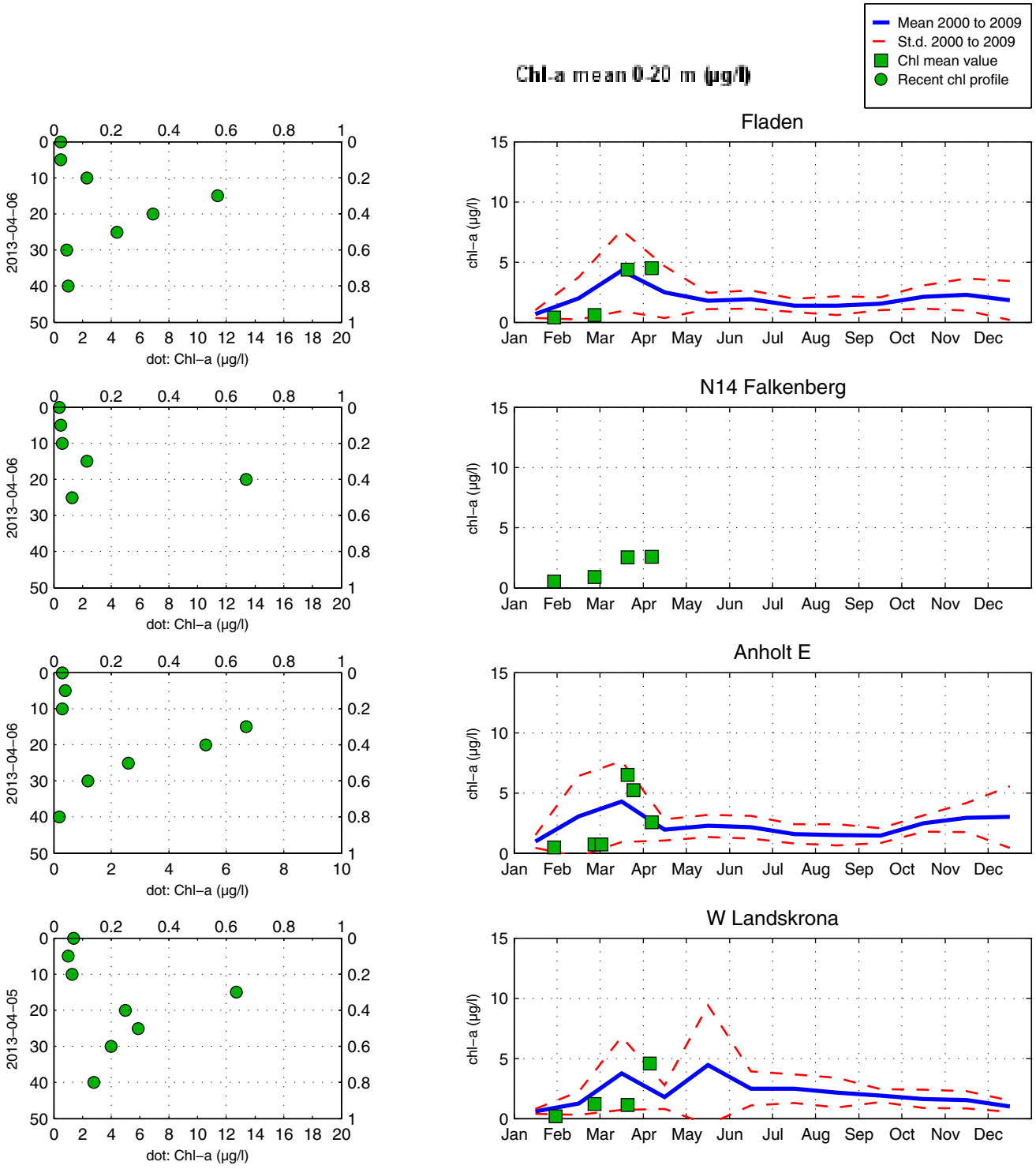
Selection of observed species	Å17	Släggö	N14	Anholt E	Anholt E
Red=potentially toxic species	6/4	6/4	6/4	6/4	7/4
	cells/l	cells/l	cells/l	cells/l	cells/l
Attheya septentrionalis		present	present		present
Chaetoceros brevis		present	present	present	present
Chaetoceros danicus			present		present
Chaetoceros debilis	present	present	present	present	present
Chaetoceros decipiens	present	present	present	present	
Chaetoceros socialis		present			present
Detonula confervacea	present	present	present	present	common
Licmophora spp.		present			
Navicula transitans					present
Rhizosolenia hebetata	common	very common	common	common	present
Rhizosolenia setigera			present	present	present
Skeletonema marinoi	present	present	present	present	very common
Thalassionema nitzschioides	present		present	present	present
Thalassiosira angulata			present		
Ceratium tripos	present	present			present
Gymnodiniales spp.	present			present	present
Gyrodinium spirale	present		present		present
Heterocapsa rotundata	present	present	present	present	present
Heterocapsa spp.	present	present	present		
Katodinium glaucum	present				
Peridiniales spp.	present			present	
Peridiniella danica				present	
Protoperidinium brevipes	present				
Protoperidinium pellucidum		present	present		
Protoperidinium spp.	present	present	present	present	
Phaeocystis spp.		present			
Prymnesiales spp	present		present		
Cryptomonadales spp	common	common	common	present	present
Pseudopedinella pyriforme	present	present	present	present	present
Dinobryon balticum	present			present	present
Dinobryon spp.	present	present	present	present	present
Calliacantha longicaudata				present	
Calliacantha natans				present	present
Craspedophyceae		present		present	
Cryothecomonas scybalophora		present			
Ebria tripartita	present	present	present	present	present
Katablepharis remigera	present		present		present
Telonema spp.	present				
Mesodinium rubrum	present		present		present
Ciliophora spp.	present	present	present	present	present

Selection of observed species	BY2	BY5	BCS III-10	BY15	BY38	REF M1-V1
Red=potentially toxic species	7/4	8/4	8/4	9/4	4/4	5/4
	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l
Achnanthes taeniata	common	common	present	common		very common
Attheya septentrionalis	present					present
Chaetoceros brevis						common
Chaetoceros cf. *ceratosporus*		present				
Chaetoceros laciniosus			present	present		common
Chaetoceros similis	present					
Chaetoceros cf. *simplex*	present	present	present	present	present	present
Chaetoceros socialis						common
Chaetoceros subtilis	common	present	present	present	present	
Chaetoceros wighamii	90 000	66 000	present	common		very common
Melosira arctica	present					120 000
Navicula transitans	present					
Skeletonema marinoi	900 000	820 000	97 000	common	present	3.7 million
Thalassiosira spp.						
Thalassiosira cf. *baltica*	common	present		present		common
Thalassiosira cf. *levanderi*	very common	present	present	very common		common
Amphidinium sphenoides		present				
Dinophysis acuminata			present	present		
Dinophysis norvegica					present	
Heterocapsa rotundata		present		present	present	
Heterocapsa triquetra				present		
Heterocapsa spp.	present	common	present	present	common	
Gymnodiniales spp.	present	present	present	present	present	
Katodinium glaucum		present			present	
Peridiniales spp.	present				present	
Peridiniella catenata					present	
Protoperidinium spp.		present	present	present	present	
cf. *Scrippsiella hangoei*	present	present	present	present	very common	present
Eutreptiella spp.	present	present	common	common	common	present
Dinobryon balticum					present	
Dinobryon faculiferum						present
Dinobryon spp.						present
Pseudopedinella pyriforme		present		present	present	present
Pyramimonas spp.	present	present	present	common	common	present
Cyanobacteria colonies	common	common	common	common	common	common
Cyanodictyon spp.		common		common		
Woronichinia spp.			common		common	
Prymnesiales				present	present	
Cryptomonadales	common	common	common	common	common	common
Rhodomonas spp.	present	present	present			
Calliacantha natans	present	present		present		present
Choanoflagellate colonies	present	present	present		present	440 000
Ebria tripartita	present	present	present		present	present
Katablepharis remigera			present		present	present
Telonema spp.	present	present	present		present	common
Flagellates	common	present	common	present	present	common
Ciliophora	present	common	common	present	common	present
Mesodinium rubrum	present	present	common	present	present	present

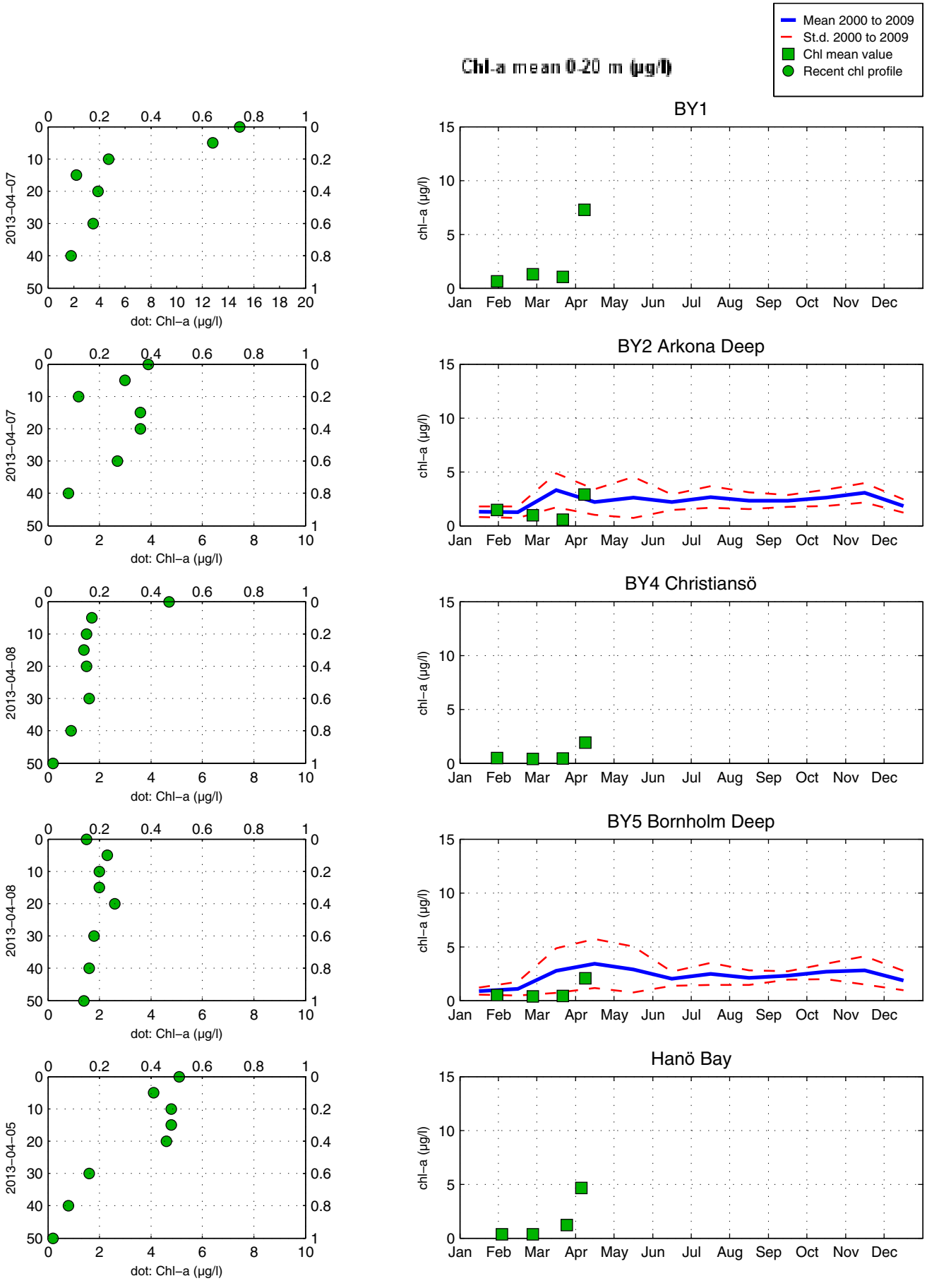
The Skagerrak



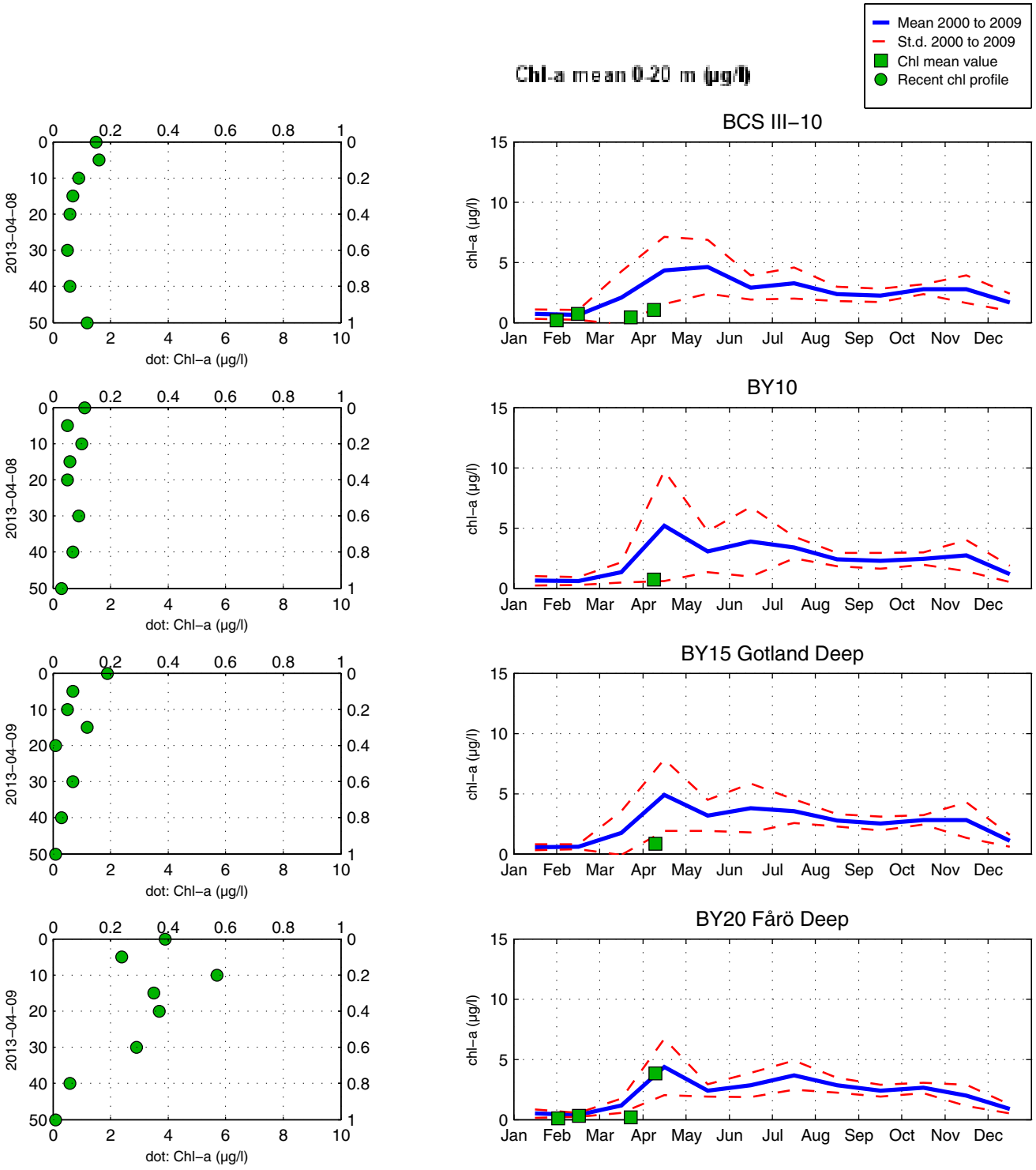
The Kattegat and the Sound

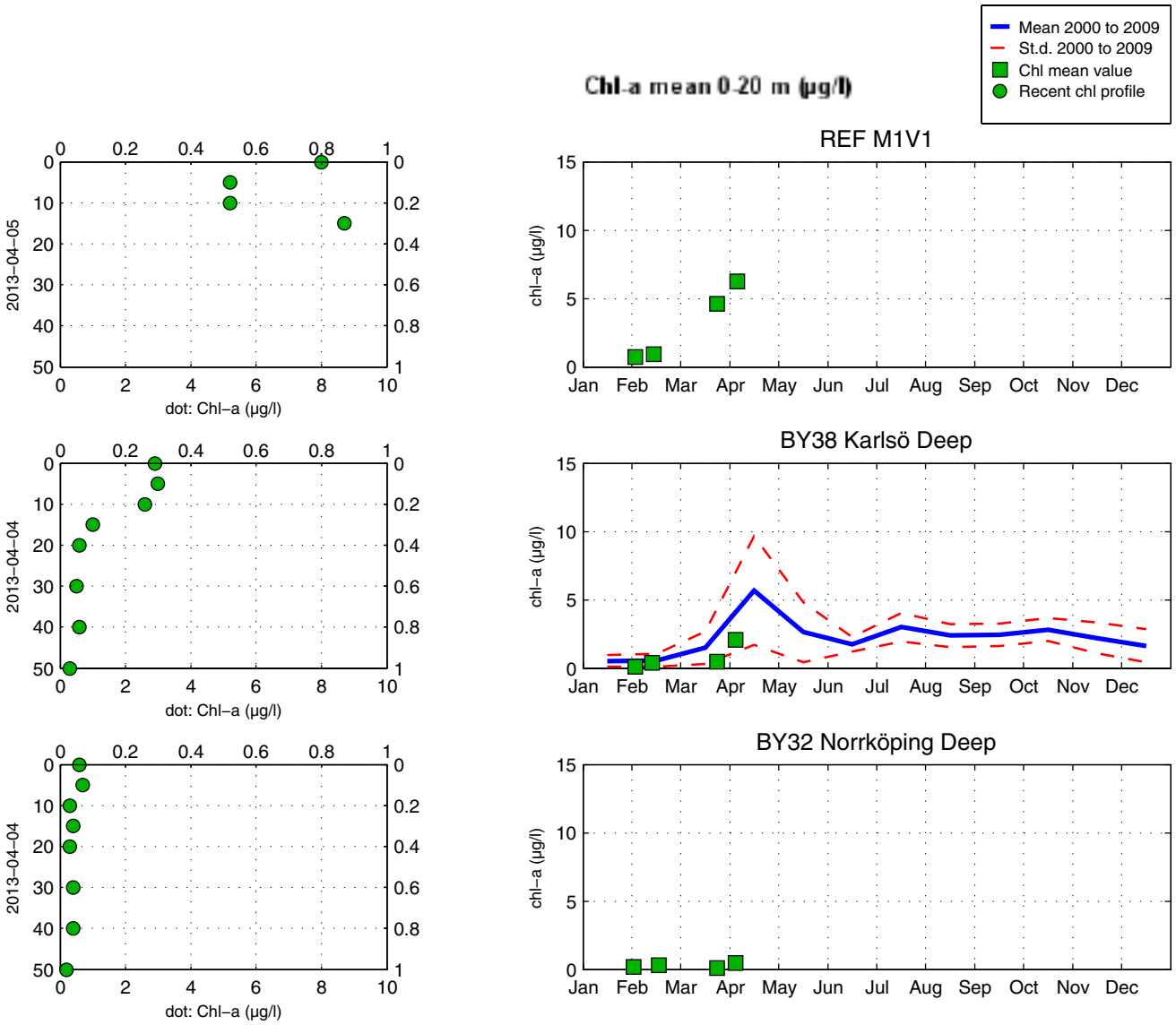


The Southern Baltic



The Eastern Baltic





Om klorofylldiagrammen

Klorofyll *a* är ett mått på mängden växtplankton. Prover tas från ett antal djup. 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. Tekniska problem orsakade brist på klorofyllresultat i Skagerrak och ctd-resultat från hela resan.

About the chlorophyll graphs

Chlorophyll *a* is sampled from several depths. 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. Due to technical problems, chlorophyll results is missing from the Skagerrak and ctd data from the eintire expedition.

Om AlgAware

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

About AlgAware

The SMHI carries out monthly cruises 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
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 or 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.
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.
Chaetoceros concavicornis/ C.convolutus	Mechanical damage through hooks on setae	**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.
Pseudochattonella 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.

Översikt över några 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.