SMHI
Oceanographic Unit
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AlgAware
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

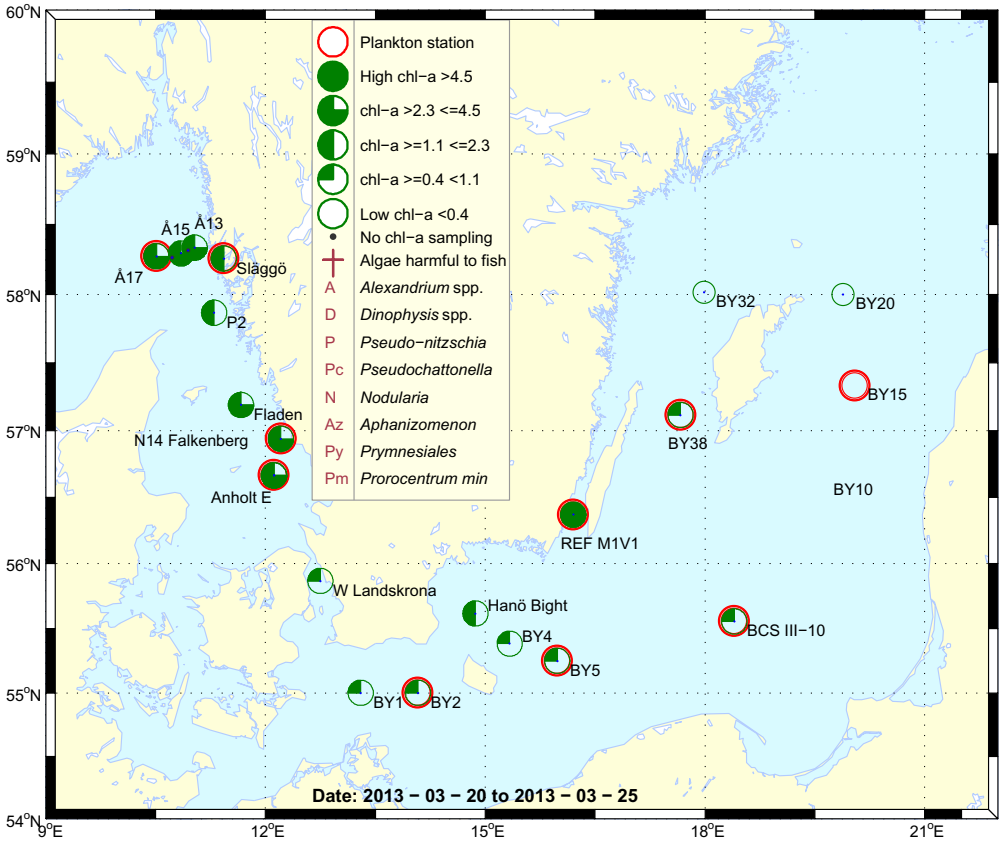
Sammanfattning

I Skagerrak återfanns resterna av vårblomningen i ytvattnet. Klorofyllfluorescensprofilen visade ett maximum vid ca 15 meter. Kiselalger dominerade i ytvattnet och framför allt *Skeletonema marinoi* samt *Detonula confervacea* var vanliga. I Kattegatt var vårblomningen i full fart men vid andra provtagningen vid Anholt E hade algerna vid ytan börjat sjunka ner mot djupet. Även här återfanns fram för allt *Skeletonema marinoi* men även *Detonula confervacea* i höga tätheter.

De integrerade (0-20 m) klorofyll *a*-värdena var inom det normala för månaden. Relativt höga klorofyllvärden uppmättes på enskilda djup, mellan 10-20 meter vid de flesta stationer i Skagerrak och Kattegatt.

Vårblomningen av kiselalger hade startat i Kalmarsund, men i egentliga Östersjön var cellantalen väldigt låga och det fanns inga kiselalger. Runt Bornholm kunde man ana en begynnande kiselalgsblomning, men cellantalen var fortfarande låga.

De integrerade klorofyll *a*-värdena var låga i Östersjön och under medel vid många stationer. Bara i Kalmarsund var klorofyllvärdena förhöjda.



Abstract

Remnants of the spring bloom were found in the surface water at both stations in the Skagerrak. The chlorophyll fluorescence maxima indicated that the bloom was sinking down considering they were found at approximately 15 meters. Diatoms dominated in the surface water and *Skeletonema marinoi* and *Detonula confervacea* were the most abundant. The spring bloom was present at both stations in the Kattegat. The bloom had however emerged downwards on the second sampling occasion at Anholt E. *Skeletonema marinoi* and *Detonula confervacea* were the most abundant species.

The integrated (0-20 m) chlorophyll *a* concentrations were within normal for this month. Quite high concentrations were found at single depths between 10-20 meters at most of the stations in the Skagerrak and Kattegat areas.

The diatom spring bloom had started in the Kalmar Sound, but not yet in the Baltic proper where the cell densities were very low and no diatoms were found in the samples. Diatoms were present in the area around Bornholm with low cell numbers.

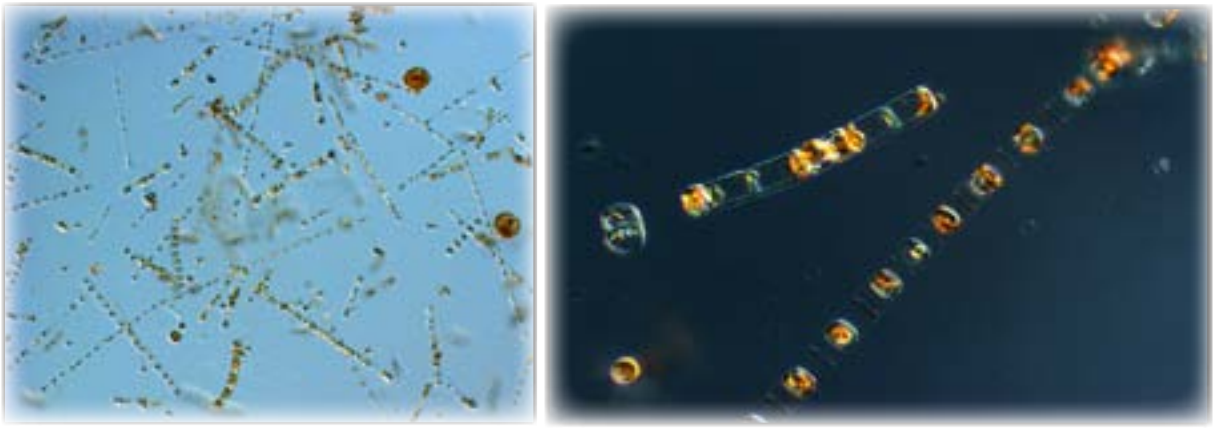
The integrated (0-20m) chlorophyll *a* concentrations were low in the Baltic Sea and below average at many stations. In the Kalmar Sound, the chlorophyll concentrations were rather high.

More detailed information on species composition and abundance

The Skagerrak

Å17 (open Skagerrak) and Släggö (Skagerrak coast)
The species diversity was high. The phytoplankton community was dominated by the diatoms *Skeletonema marinoi*, *Detonula confervacea*, *Rhizosolenia hebetata f. semispina* and several species of the genus *Chaetoceros*. The chlorophyll fluorescence profile indicated that a previous bloom was sinking down considering a fluorescence peak was observed at 15 meters. Extra water samples were taken at the depth of the fluorescence peak. More or less the same species were found compared to the surface water (0-10 m) but with higher cell numbers.

The integrated (0-20 m) chlorophyll *a* concentrations were within normal for this month and the maxima were found at 20 meters at Å17 and at 10 meters at Släggö.



The diatom bloom found at the Skagerrak and Kattegat stations was dominated by the diatoms *Detonula confervacea* and *Skeletonema marinoi* (Picture to the right, *S. marinoi* is the lower chain). Photos: Marie Johansen.

The Kattegat

N14 Falkenberg and Anholt E
A diatom bloom was present at both stations. The species diversity was high and the diatom *Skeletonema marinoi* was the most common with more than 2 million cells per liter. Other diatoms that were common were *Detonula confervacea*, *Chaetoceros debilis* and the genus *Thalassiosira*. The bloom intensity in the surface water (0-10) had decreased on the second sampling occasion at Anholt E. The chlorophyll fluorescence peaked at about 14 meters at the second visit and indicated that the bloom was sinking down.

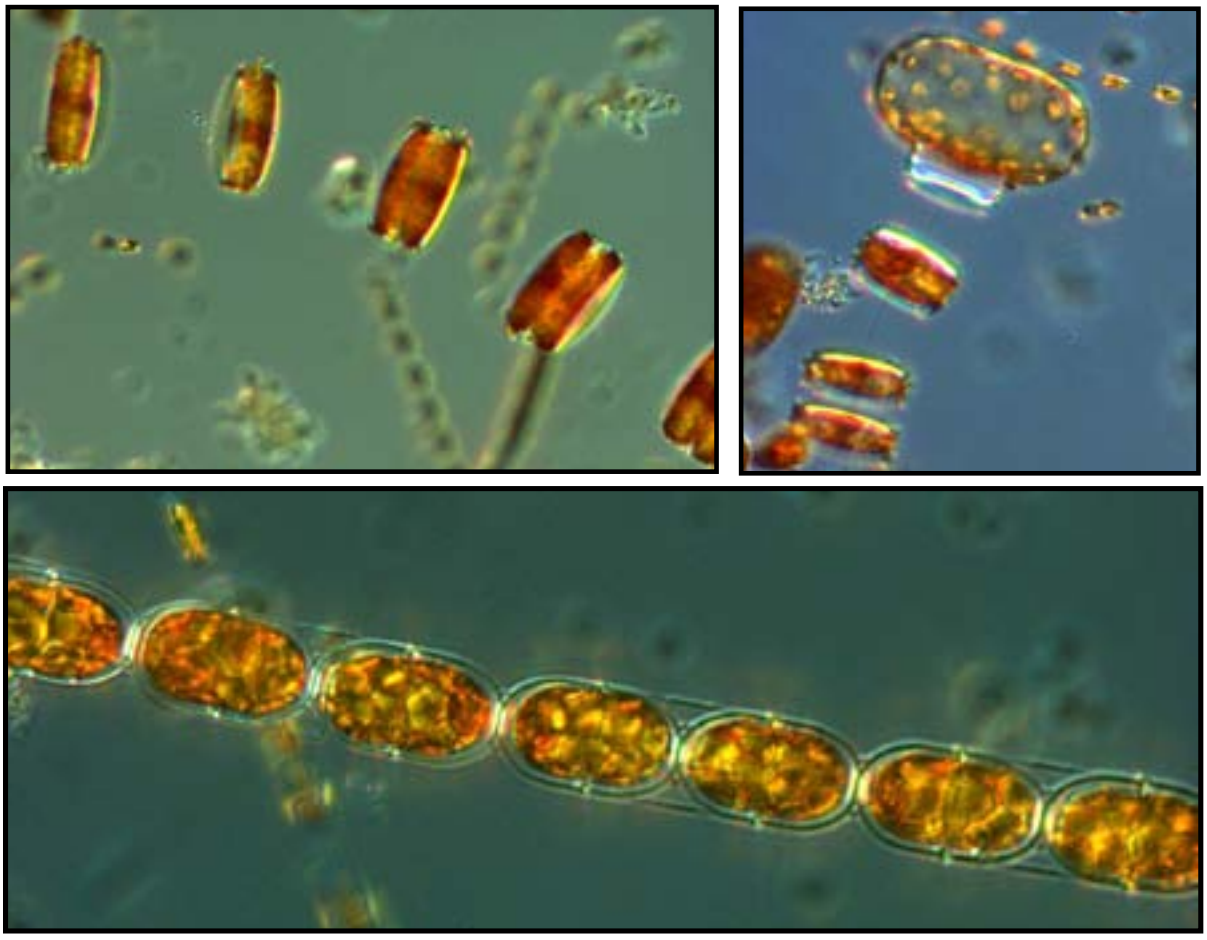
The integrated (0-20 m) chlorophyll *a* concentrations were within normal for this month.

The Baltic Sea

BY2 Arkona, BY5 Bornholms Deep, BCS III-10 21st - 22nd of March
These stations had a similar species composition. *Skeletonema marinoi* and cryptomonads dominated and the cell densities were low.

BY15 and BY38, 22nd – 23rd of March
The phytoplankton diversity was very low. Cryptomonads dominated at both stations and *Aphanizomenon flos-aquae* was present at BY38 (Karlsö Deep).

Ref M1V1 Kalmar Sound 23rd of March
The diatom spring bloom had started in the Kalmar Sound. The chlorophyll *a* concentrations were high compared to other stations in The Baltic Sea. The diatom *Skeletonema marinoi* was blooming and species from the genus *Thalassiosira* were common. There were also several species from the genus *Chaetoceros.*



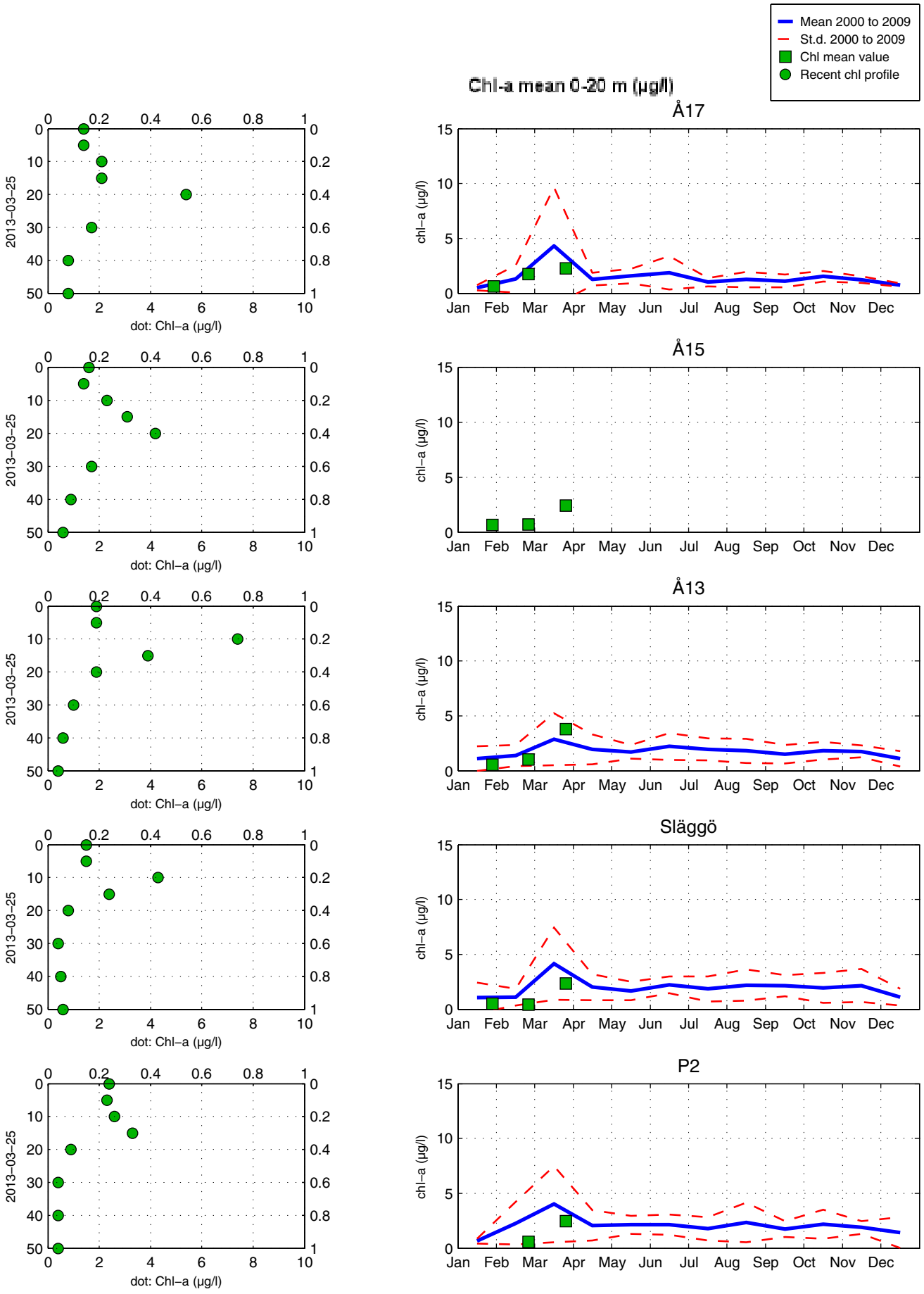
The diatoms *Thalassiosira* cf. *eccentrica* and *Melosira arctica* were present at Ref M1V1 in Kalmar Sound. Left: *T.* cf. *eccentrica*, right: *T.* cf. *eccentrica* with resting cyst, below: *Melosira arctica*. Photos: Malin Mohlin.

Phytoplankton analysis and text by:
Malin Mohlin and Marie Johansen

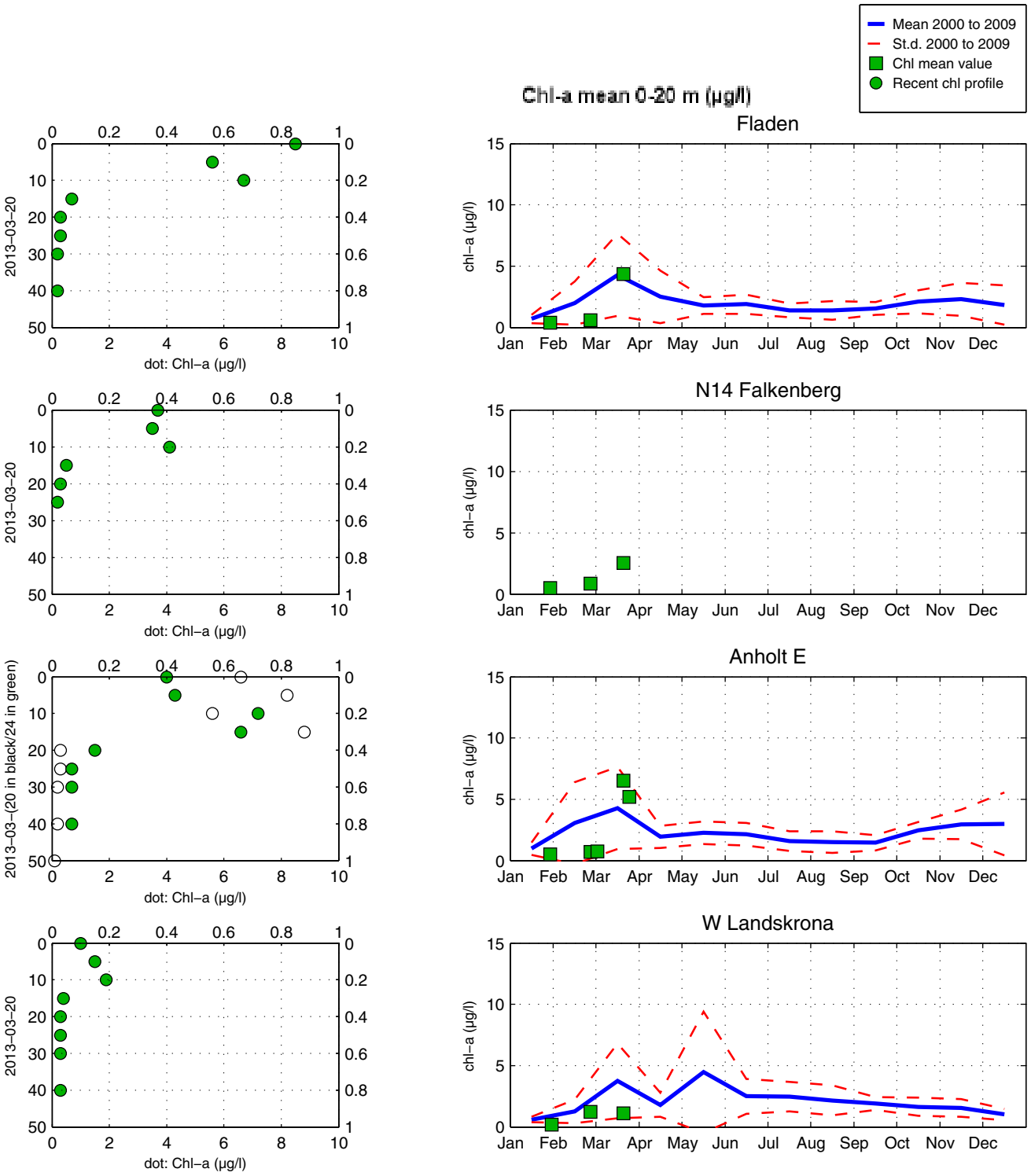
Selection of observed species	Å17	Släggö	N14	Anholt E	Anholt E
Red=potentially toxic species	25/3	25/3	20/3	20/3	24/3
	cells/l	cells/l	cells/l	cells/l	cells/l
Navicula spp	present		present	present	present
Thalassionema nitzschioides	present	common	common	common	present
Coscinodiscus concinnus			present		
Detonula confervacea	common	common	2 000 000	800 000	1 000 000
Porosira glacialis			present		present
Rhizosolenia setigera	present	present	present	present	present
Skeletonema marinoi	very common	common	3 500 000	2 200 000	1 700 000
Thalassiosira spp			present		common
Thalassiosira anguste-lineata		present			
Thalassiosira minima	very common		1 300 000	very common	common
Thalassiosira nordenskioeldii	present		common	common	present
Chaetoceros spp	common	present	common	common	common
Chaetoceros brevis				present	
Chaetoceros danicus			present		present
Chaetoceros debilis	common	common	very common	very common	very common
Chaetoceros decipiens			present	present	
Chaetoceros socialis	common		common	common	
Chaetoceros subtilis v. *subtilis*		present	present		
Chaetoceros tenuissimus	present				
Chaetoceros wighamii			present		
Rhizosolenia hebetata f. *semispina*	common	common	common	present	present
Navicula transitans v. *transitans*			present		
Ceratium fusus			present		
Ceratium longipes				present	
Ceratium tripos		present	present		present
Dinophysis acuminata		present			
Dinophysis norvegica		present			
Gymnodiniales spp	common	present			present
Gyrodinium spirale	present	present			
Heterocapsa rotundata		present	common	common	common
Katodinium glaucum		present	present		
Peridiniales spp		present			
Protoperidinium spp		present			
Protoperidinium pallidum		present			
Protoperidinium pellucidum	present	present			
Prymnesiales spp		present			
Ebria tripartita		present	present	present	present
Cryptomonadales spp			present		
Plagioselmis spp			present	present	
Plagioselmis prolonga	present		present		
Teleaulax spp	present	common	common	common	present
Apedinella radians					present
Dictyocha speculum					present
Craspedophyceae	common	present	common	common	common
Katablepharis remigera	present			present	present
Mesodinium rubrum		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	**21/3**	**21/3**	**22/3**	**22/3**	**23/3**	**23/3**
	cells/l	**cells/l**	**cells/l**	**cells/l**	**cells/l**	**cells/l**
Achnanthes spp						present
Attheya septentrionalis		present				
Bacillariophyceae	present					
Chaetoceros spp	present	present				common
Chaetoceros subtilis	present					present
Chaetoceros wighamii	present					common
Coscinodiscus radiatus			present			
Detonula confervacea	present					
Melosira arctica						present
Skeletonema marinoi	common	present	present	present		common
Thalassiosira spp	present					present
Thalassiosira cf. *eccentrica*						common
Thalassiosira cf. *minima*	present					present
Dinophysis acuminata			present			
Dinophysis norvegica		present				
Peridiniella catenata						present
Protoperidinium spp	present	present				
Pterosperma spp						present
Pyramimonas spp					present	present
Aphanizomenon flos-aquae					present	
Woronichinia elorantae			present			
Cryptomonadales	present	present	present	present	present	present
Plagioselmis spp	present	present	present	present	present	present
Teleaulax spp	present	present	present	common	present	present
Flagellates	present	present	present	present	present	present
Unicell	present	present	present	present		present
Ciliophora	present	present	present	present		present
Mesodinium rubrum	present	present	present		present	present

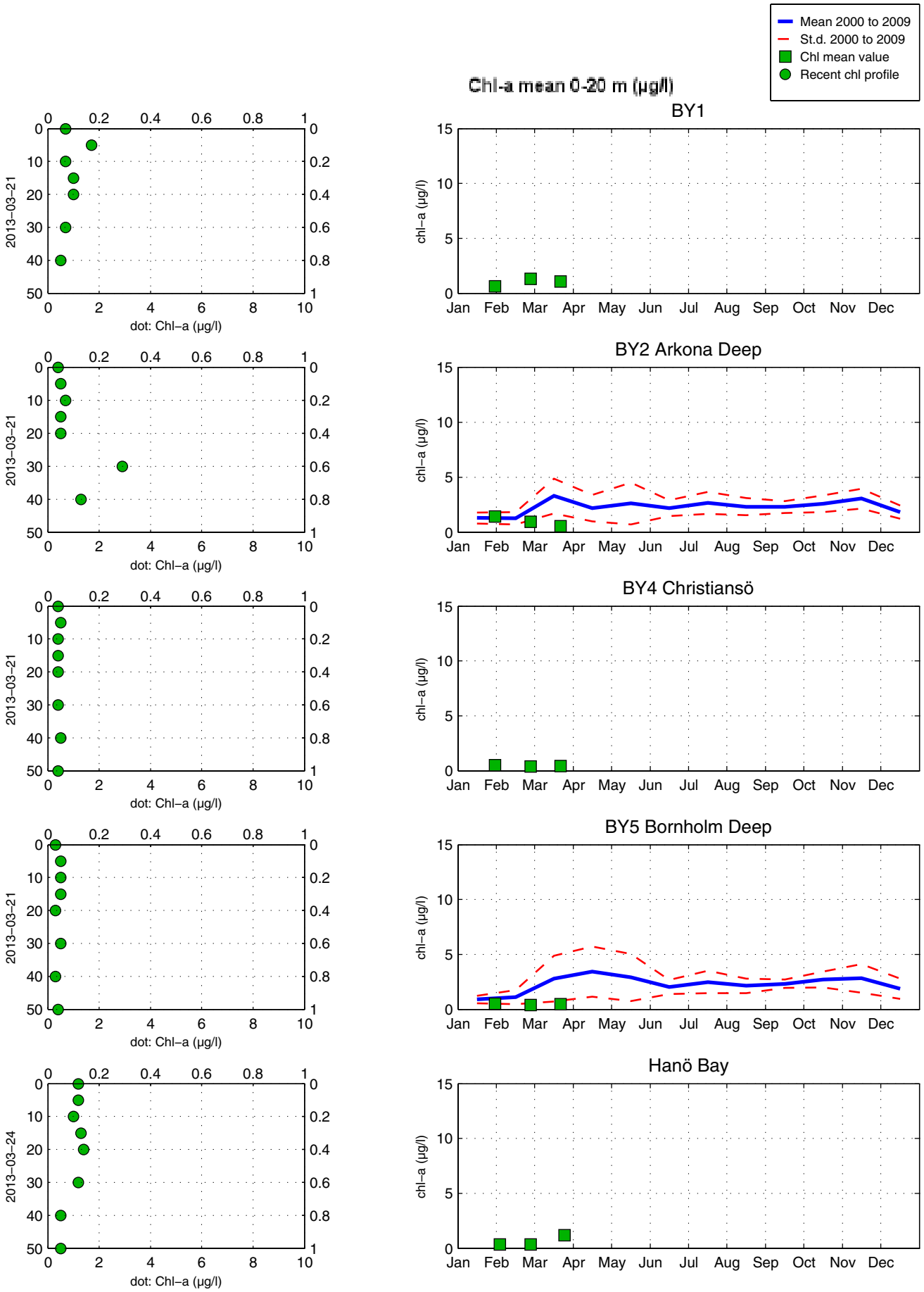
The Skagerrak



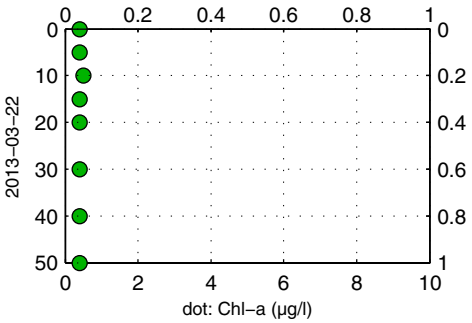
The Kattegat and the Sound

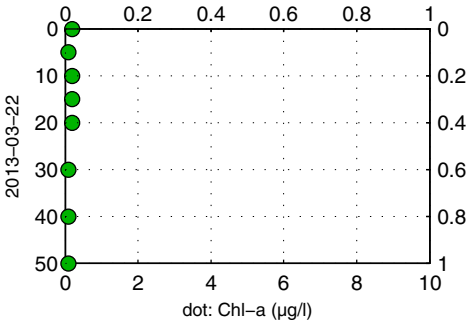


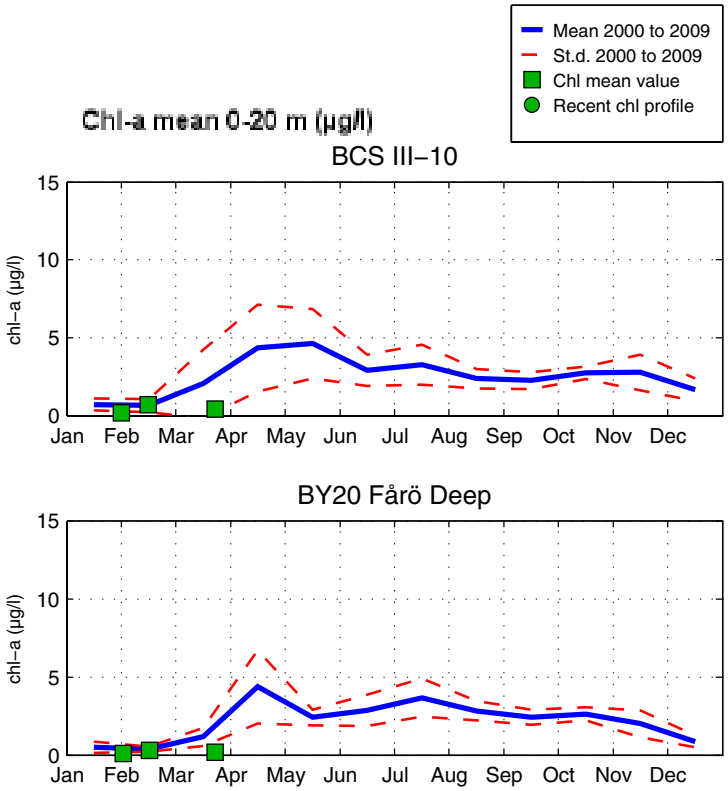
The Southern Baltic

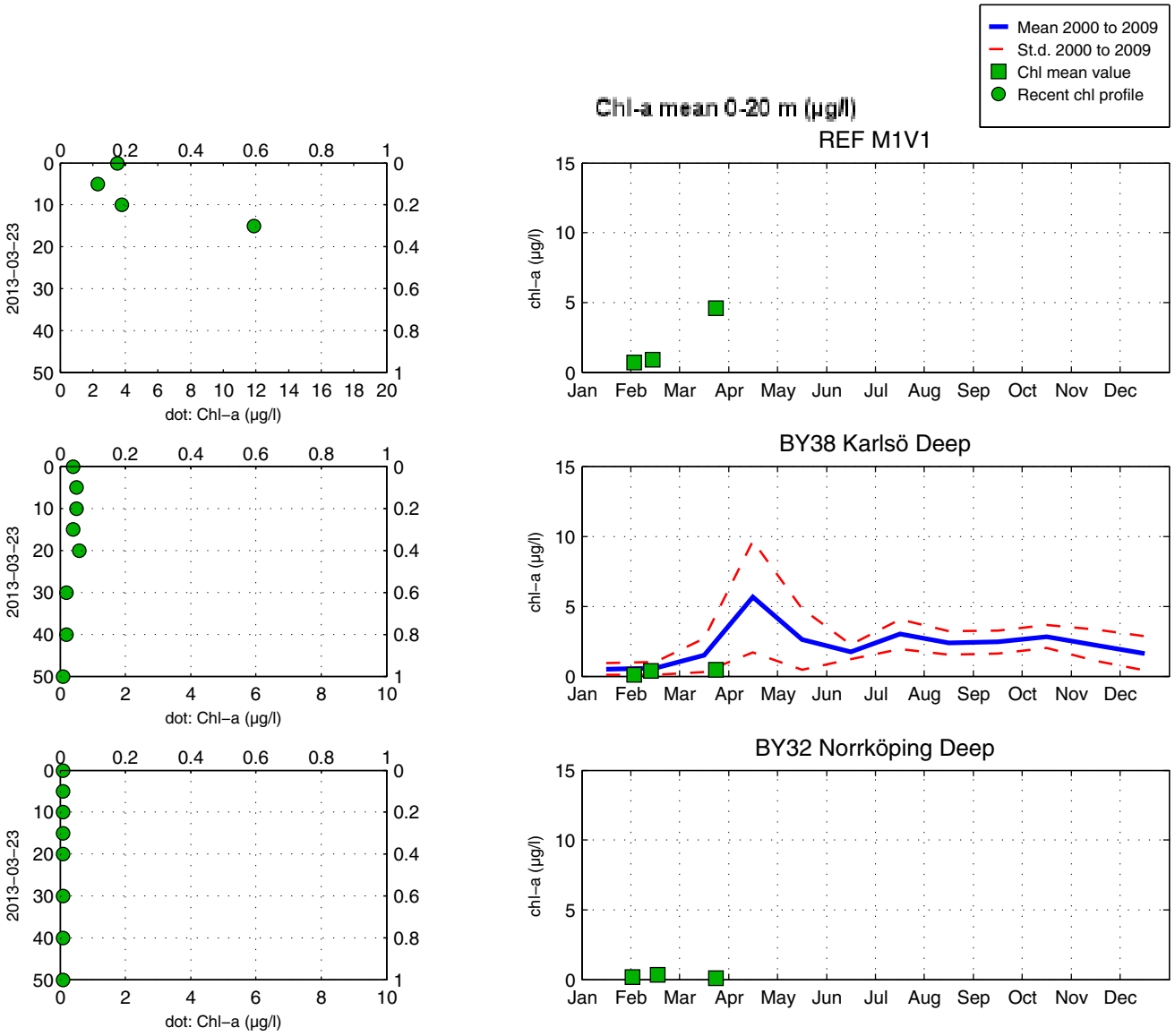


The Eastern Baltic









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.

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.

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.