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SMHI
Oceanographic Unit
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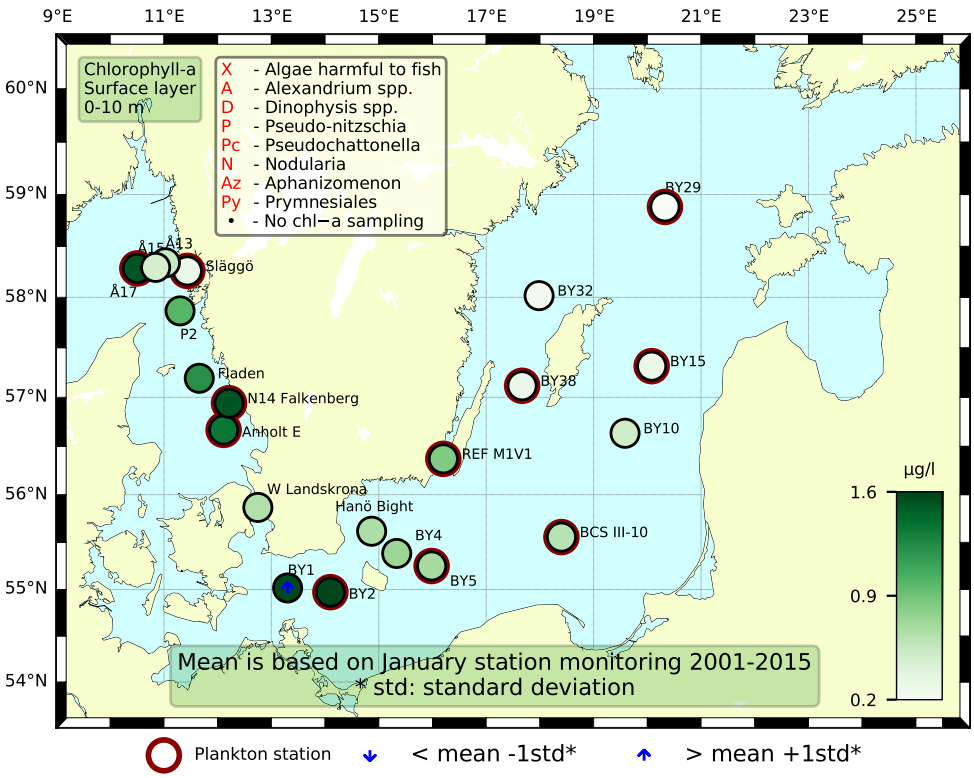
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Diversiteten av växtplankton och totalt antal celler var lite högre än man kan förvänta sig av årstiden förutom vid station Släggö där både cellental och biodiversitet var låga. Kiselalger dominerade överlag i antal vid samtliga stationer. Framför allt var kiselalgssläktet *Pseudo-nitzschia** vanlig vid samtliga stationer. Den för fisk skadliga nålflagellaten *Heterosigma akashiwo** var vanlig vid ett par stationer. De integrerade klorofyllvärdena var låga vid samtliga stationer vilket är normalt för månaden. Vid Släggö var de riktigt låga och nära noll.

Diversiteten och cellantalet var allmänt låg vid Östersjöstationerna och de flesta stationerna var dominerade av små celler och ciliater, samt ett fåtal större kiselalger. BY2 hade högst diversitet, där det förutom allt smått, även fanns en del större kiselalger samt en del arter dinoflagellater. BCSIII-10 och REFM1V1 hade ett fåtal av den toxinproducerande arten *Dinophysis acuminata** och BY38 ett par trådar av den filamentösa cyanobakterien *Aphanizomenon* sp. Överlag var de integrerade klorofyllhalterna låga men normala för månaden.



Abstract

The phytoplankton diversity and total cell numbers were higher than expected for the season except at station Släggö where both total cell numbers and biodiversity were low. Diatoms dominated at all stations. Overall the diatom *Pseudo-nitzschia** was common. The ichtyotoxic species *Heterosigma akashiwo** that belongs to the Raphidophyceae was common at a couple of stations. The integrated chlorophyll concentrations were low but within normal for the month. At Släggö they were very low almost close to zero.

The phytoplankton diversity and abundance were generally low at the Baltic stations and most stations were dominated by small cells and ciliates, and a few larger diatoms. BY2 had highest diversity, where in addition to all small cells, several larger diatoms species and dinoflagellates were found. BCSIII-10 and REFM1V1 had a few of the toxin producing *Dinophysis acuminata** and BY38 some strains of the filamentous cyanobacteria *Aphanizomenon* sp. Overall, the integrated chlorophyll concentrations were low but normal for the month.

Below follows a more detailed information on species composition and abundance. Species marked with * are potentially toxic or harmful.

The Skagerrak

Å17 (open Skagerrak) 8th of January

The species diversity was relatively high but total cell numbers was quite low. Diatoms dominated in cell numbers and *Pseudo-nitzschia** was most common but the dinoflagellate *Tripos lineatus* was also present in moderate cell numbers. The coccolithophore *Emiliania huxleyi* and the raphidophyceae *Heterosigma akashiwo** were both also found in relatively high cell numbers. The integrated chlorophyll concentration was low but within normal for this month.

Släggö (Skagerrak coast) 8th of January

The biodiversity and total cell numbers were both very low which is not unusual for the month. Most commonly found was the diatom genus *Pseudo-nitzschia**. Some medium sized cells of unidentifiable naked dinoflagellates were also found. A lot of very small unidentified cells were found among the smallest cells. The integrated chlorophyll concentrations were very low almost close to zero.

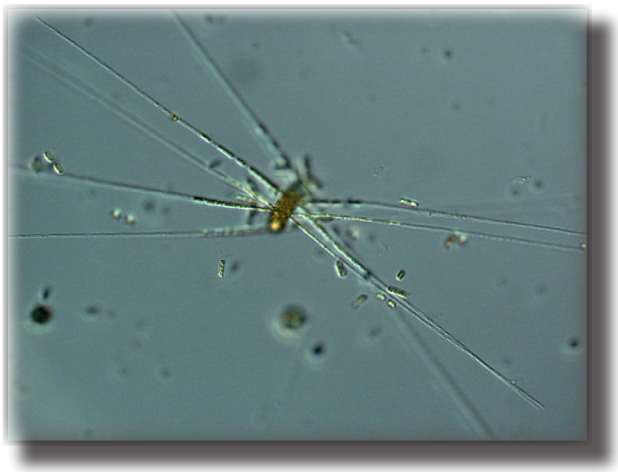
The Kattegat

Anholt E 14th of January

The species diversity was relatively high and total cell numbers were moderate to low. Diatoms dominated in cell numbers with several species in relatively high cell numbers such as *Chaetoceros danicus*, *Thalassiosira rotula* and *Pseudo-nitzschia**. Among the dinoflagellates the genus Tripos was found in highest cell numbers where *Tripos lineatus* was most common. The smaller cells were quite few and mainly represented by different cryptomonadales and the coccolithophore *Emiliania huxleyi*. The integrated chlorophyll concentrations were low but within normal for this month.

N14 Falkenberg 15th of January

The species diversity and cell numbers were moderate. Diatoms dominated in cell numbers with *Pseudo-nitzschia** as the most numerous species. The diatoms *Thalassiosira gravida* and *Chaetoceros danicus* were present in moderate cell numbers. The dinoflagellates were also quite common in numbers and mainly represented by *Tripos lineatus.* The raphidophyte *Heterosigma akashiwo** was also found in relatively high numbers. A few cells of the coccolithophore *Emiliania huxleyi* was also present. The integrated chlorophyll concentrations were low but within normal for this month.



Figur 1: The diatom *Chaetoceros danicus* was common at both stations in the Kattegat area.

The Baltic

BY2 10th of January
Slightly higher diversity than the other Baltic stations, but low abundance. There were however some of the smaller cells such as Cryptomonadales, small Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates as well as flagellates and unicells. Some Centrales, *Coscinodiscus centralis* and *Chaetoceros danicus* were found, as well as the colony-forming cyanobacteria *Snowella* sp. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were high but within normal for this month.

BY5 11th of January
Both phytoplankton diversity and abundance were low. There were however some of the smaller cells such as Cryptomonadales, small Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates as well as flagellates and unicells. Some Centrales and *Chaetoceros danicus* were found, as well as the colony-forming cyanobacteria *Snowella* sp. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

BCSIII-10 11th of January
Both phytoplankton diversity and abundance were low. There were however some of the smaller cells such as *Binuclearia lauterbornii*, Cryptomonadales, small Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates as well as flagellates and unicells. Some Centrales, colonies of the cyanobacteria *Snowella* sp. were found. The toxin producing *Dinophysis acuminata** was observed.
Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

BY15 12th of January
Both phytoplankton diversity and abundance were low. There were however some of the smaller cells such as Cryptomonadales, small Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates as well as flagellates and unicells. Some colonies of the cyanobacteria *Snowella* sp. were found. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within normal for this month.

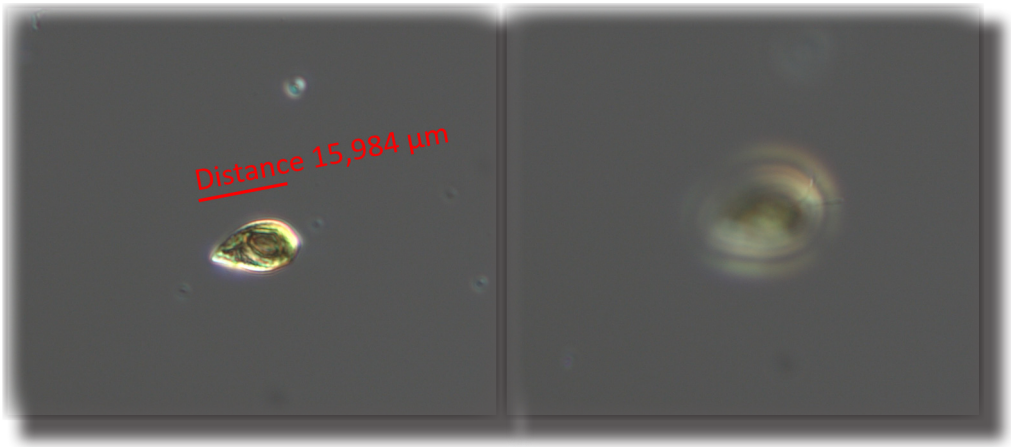


Fig. 2. Cryptomonadales was abundant at all Baltic stations. Cell in focus (left) and the two flagella in focus (right).

BY29 12th of January
This station had the lowest diversity and abundance. The phytoplankton community consisted of smaller cells such as Cryptomonadales, small Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates as well as flagellates and unicells. Several colonies of the cyanobacteria *Snowella* sp. were found. The integrated (0-10 m) chlorophyll concentrations were low but within normal for this month.

BY31 12th of January
Both phytoplankton diversity and abundance were low. There were however some of the smaller cells such as Cryptomonadales, small Gymnodiniales (< 20 μm), ciliates as well as flagellates and unicells. Some cells of *Protoperidinium* sp. as well as colonies of the cyanobacteria *Snowella* sp. were found.

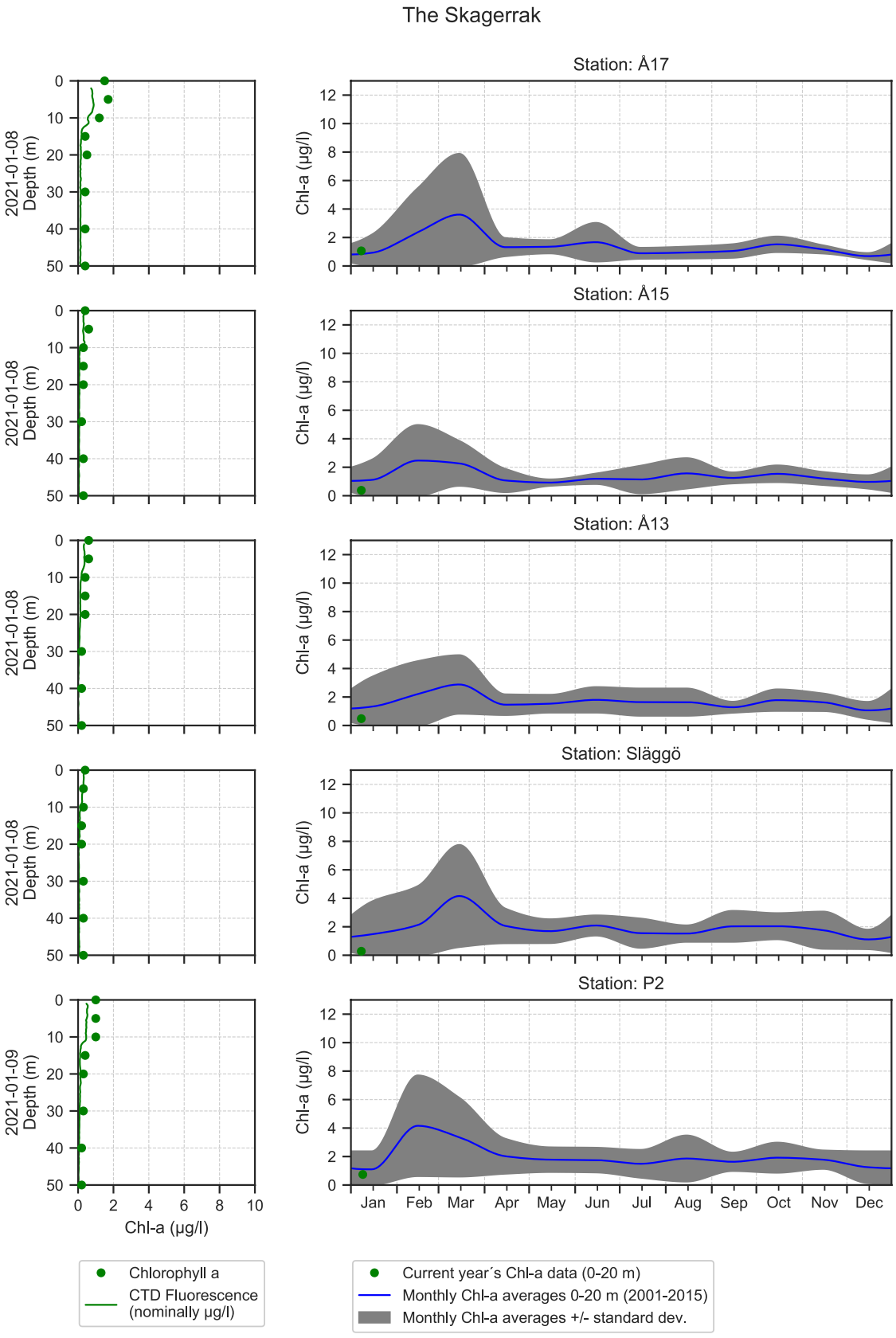
BY38 13th of January
Slightly higher phytoplankton diversity than most of the Baltic stations, but abundance was low. There were however some Cryptomonadales and unicells. This was the only station with the cyanobacteria *Aphanizomenon* sp. and *Aphanocapsa* sp. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within normal for this month.

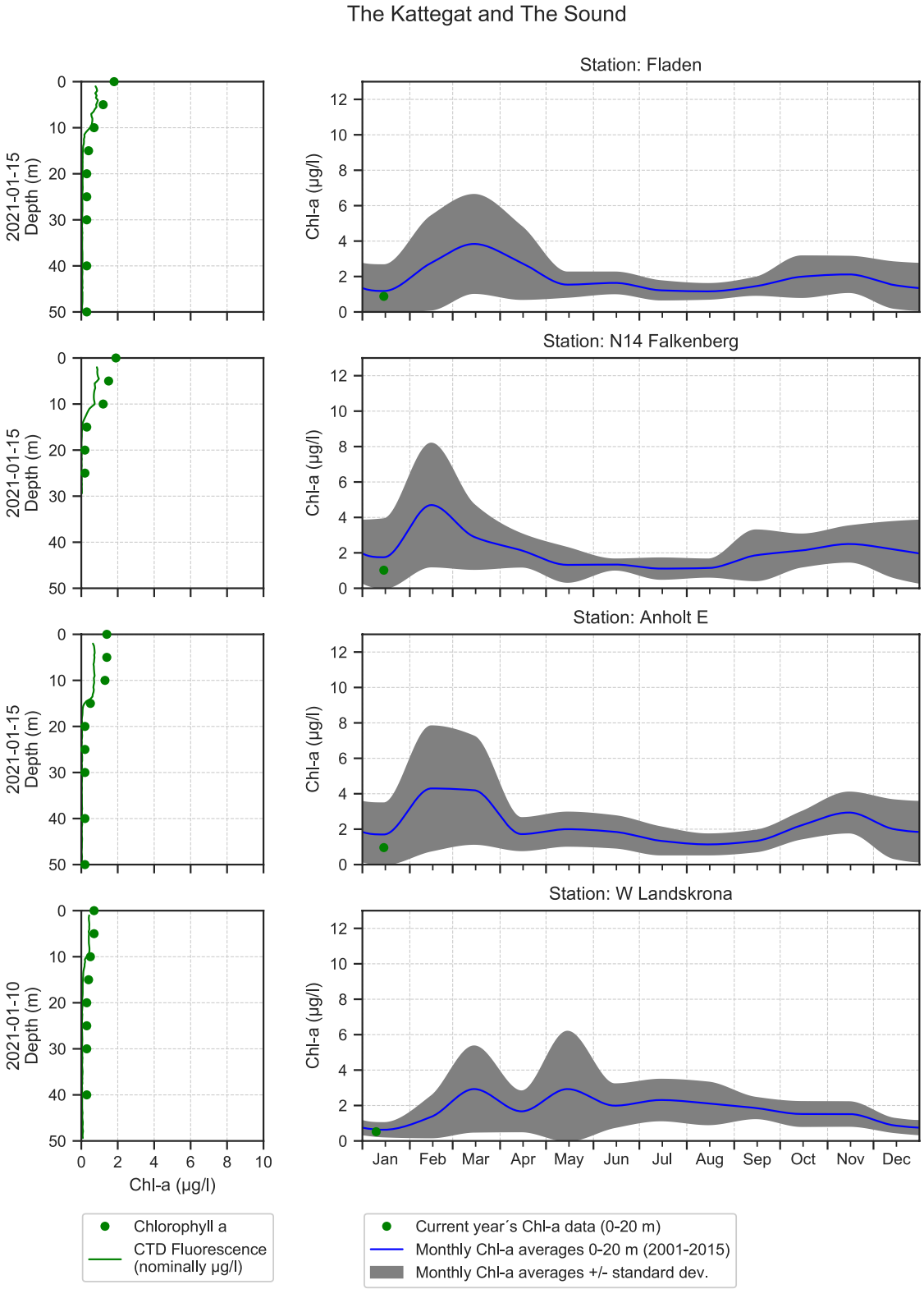
REFM1V1 13th of January
Both phytoplankton diversity and abundance were low. The phytoplankton community consisted of smaller cells such as Cryptomonadales, small Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates as well as flagellates and unicells. *Skeletonema marinoi* was also represented in somewhat high numbers. The toxin producing *Dinophysis acuminata** was observed. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

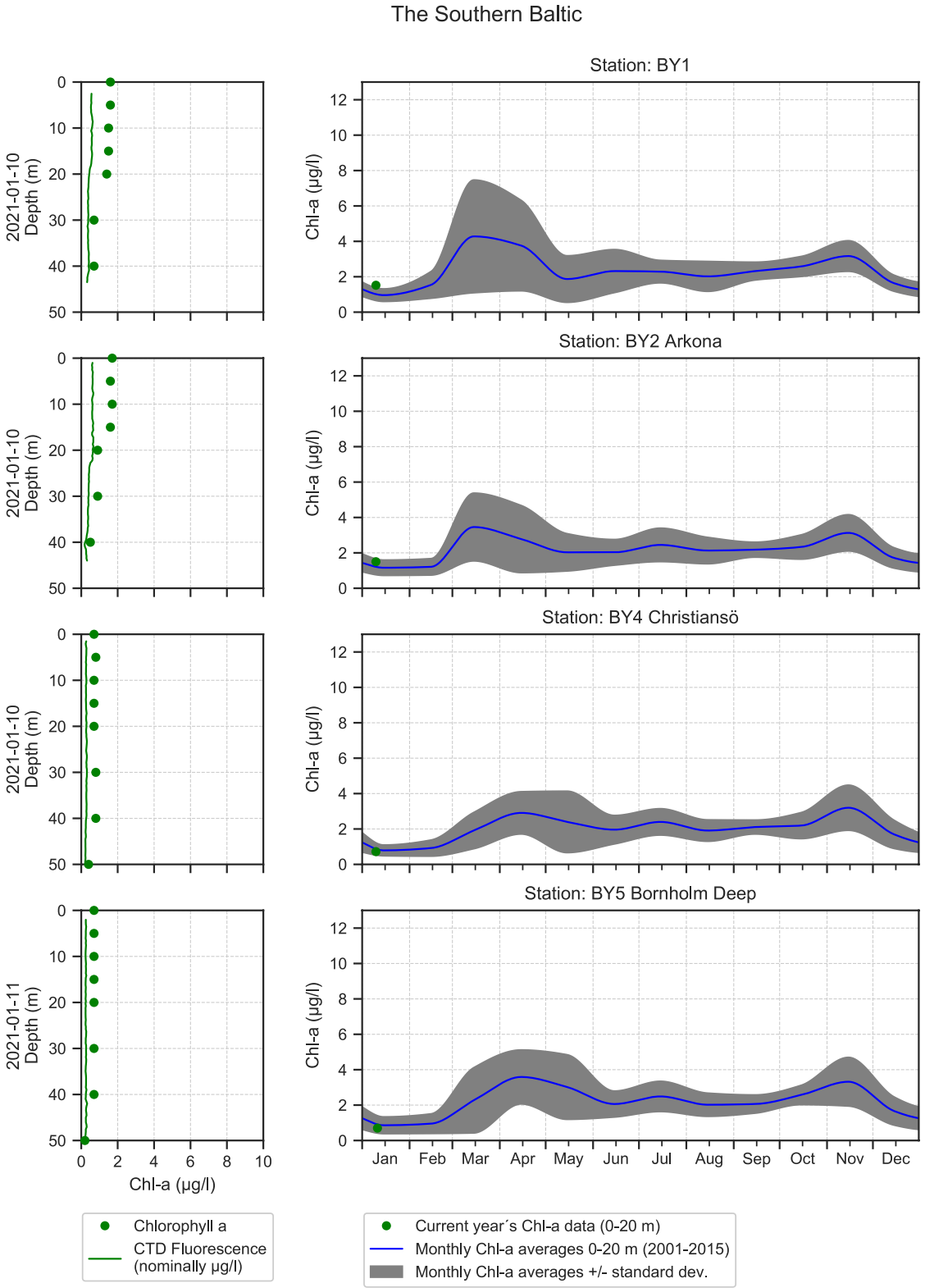
Phytoplankton analysis and text:
Marie Johansen and Maria Karlberg

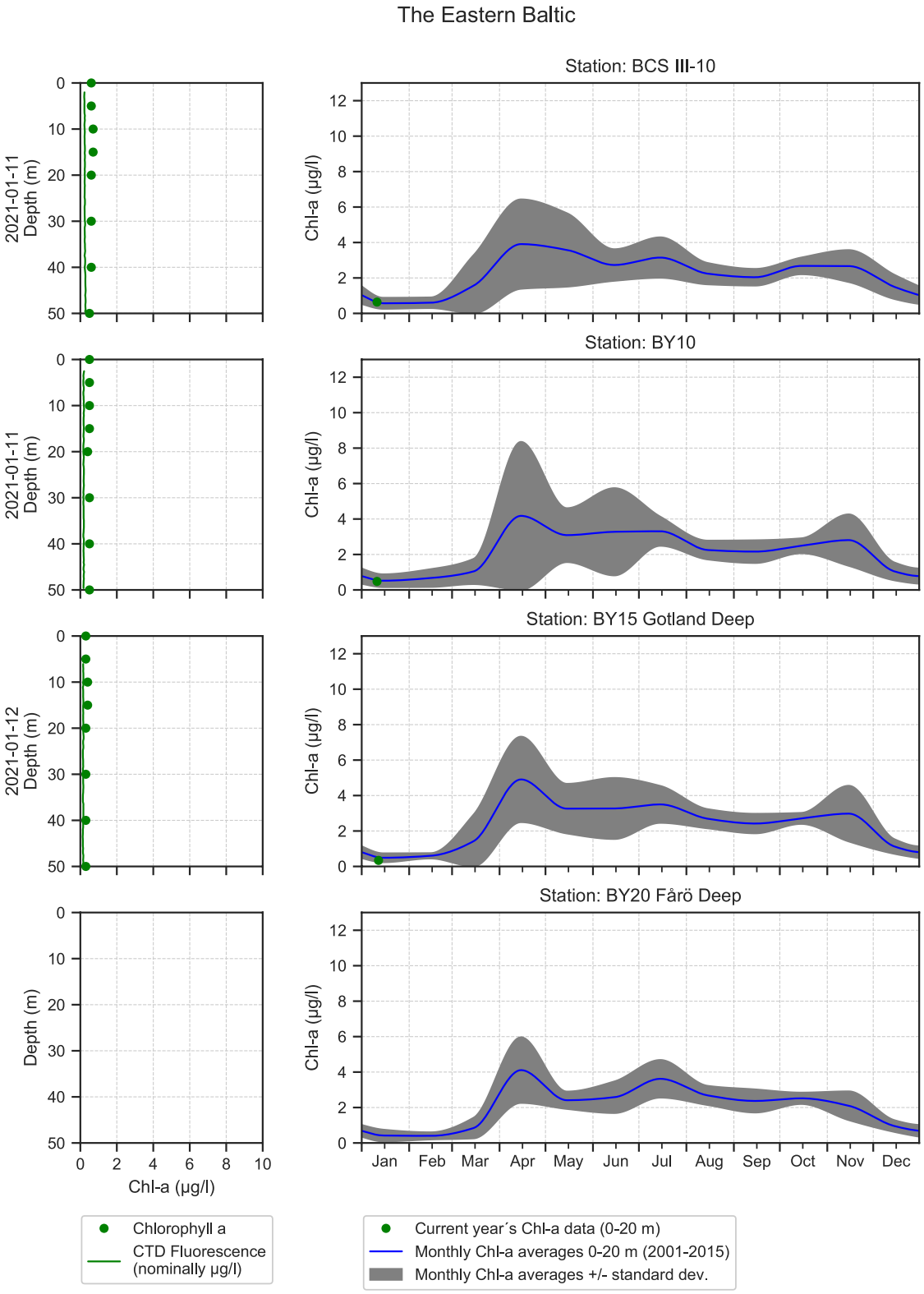
Selection of observed species	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	15/1	15/1	8/1	8/1
Hose 0-10 m	presence	presence	presence	presence
Centrales	common	present		present
Chaetoceros	present			
Chaetoceros danicus	common	common		
Chaetoceros similis	present			present
Cylindrotheca closterium		present		
Dactyliosolen fragilissimus				present
Ditylum brightwellii	present	present		present
Guinardia delicatula	present	present		
Guinardia flaccida	present	present		present
Leptocylindrus danicus		present		
Licmophora				present
Nitzschia longissima	common	present	present	present
Pennales				present
Proboscia alata	present			
Pseudo-nitzschia	very common	common	common	common
Pseudosolenia calcar-avis	present	present		
Rhizosolenia setigera	present	present		present
Rhizosolenia setigera f. pungens	present			
Skeletonema marinoi	present			present
Thalassionema nitzschioides				present
Thalassiosira	present			
Thalassiosira anguste-lineata	present	present		
Thalassiosira gravida	common	present		present
Akashiwo sanguinea	present			
Dinophysis norvegica	present	present		
Gymnodiniales	present	present	common	present
Lessardia elongata	present			
Peridiniales	present		present	present
Prorocentrum micans			present	
Protoperidinium bipes				present
Protoperidinium conicum	present	present		
Protoperidinium pallidum	present			
Protoperidinium pellucidum		present		
Tripos lineatus	common	common		common
Tripos longipes				present
Tripos macroceros				present
Tripos muelleri	present	present		
Emiliania huxleyi	present	common	present	common
Heterosigma akashiwo	present	common	present	common
Pterosperma			present	
Cryptomonadales	common	present	present	common
Telonema subtile	present			present
Dictyocha fibula				present
Octactis speculum	present			
Pseudochattonella		present		
Pseudanabaena	present	present	present	
Choanoflagellatea	present			
Ciliophora	present	present	present	present
Mesodinium rubrum		present	present	

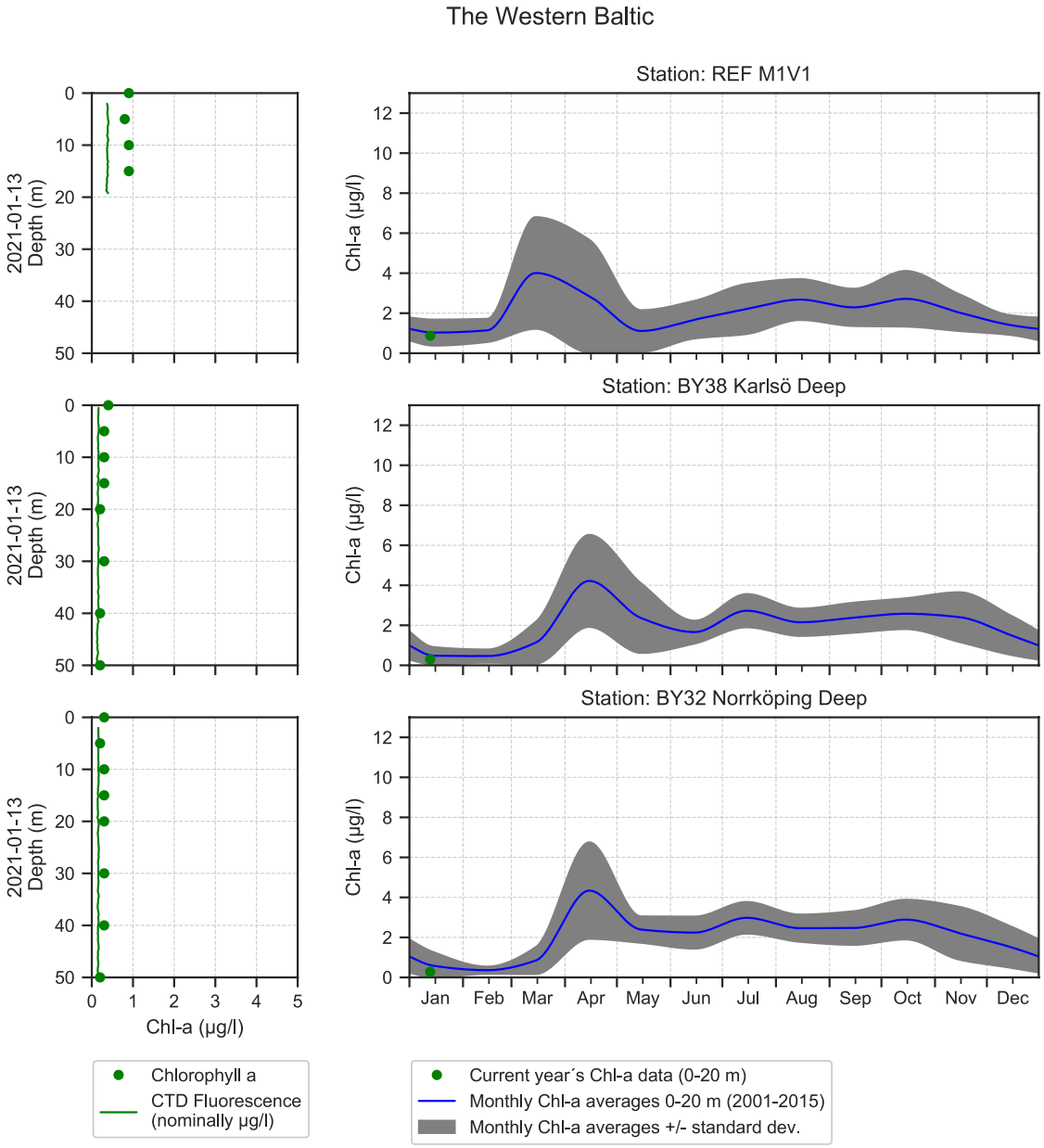
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY29	BY31	BY38	REFM1V1
Red=potentially toxic species	11/1	10/1	11/1	12/1	12/1	12/1	13/1	13/1
Hose 0-10 m	presence	presence	presence	presence	presence	presence	presence	presence
Attheya longicornis		present						
Centrales	present	present	common	present		present	present	
Chaetoceros danicus	present	present	present	present		present	present	present
Chaetoceros tenuissimus		present						
Coscinodiscus centralis		present						
Skeletonema marinoi		present				present		common
Thalassiosira nordenskioeldii	present	present	present	present	present			
Amphidinium cf. longum		present						
Dinophysis acuminata	present							present
Gymnodiniales	common	common	common	common	common	common	present	
Gymnodinium verruculosum	present	common	present	present	present	common	present	present
Gyrodinium flagellare		present	present	present	present			present
Heterocapsa rotundata		present						
Peridiniella catenata						present		present
Protoperidinium						present	present	
Monoraphidium							present	
Oocystis				present	present		present	
Binuclearia lauterbornii	common			present			present	
Pyramimonas	present	present						
Cryptomonadales	common	very common	very common	very common	common	common	common	common
Eutreptiella		present						
Aphanizomenon							present	
Aphanocapsa							present	
Snowella	common	present	present	common	common	present	present	present
Calliacantha natans	present		present	present	present	present	present	
Ciliophora	common	common	present	present	present	present	present	common
Mesodinium rubrum	common	common	common	present	common		present	common
Flagellates	common	common	common	common	present	present	present	common
Unicell	common	common	common	common	common	common	common	common


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2021-01-08
2021-01-09
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.


The Kattegat and The Sound
Station: Fladen
Station: N14 Falkenberg
Station: Anholt E
Station: W Landskrona
2021-01-15
2021-01-10
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.


The Southern Baltic
Station: BY1
Station: BY2 Arkona
Station: BY4 Christiansö
Station: BY5 Bornholm Deep
2021-01-10
2021-01-11
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.


The Eastern Baltic
Station: BCS III-10
Station: BY10
Station: BY15 Gotland Deep
Station: BY20 Fårö Deep
2021-01-11
2021-01-12
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.



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 are 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 occuring below the surface.

Om AlgAware

SMHI genomför månatliga expeditioner i Östersjön och Västerhavet. Resultat baserade på semikvantitativ mikroskopanalys av planktonprover samt klorofyllmätningar presenteras kortfattat i denna rapport. Information från SMHIs satellitövervakning av algblomningar finns under perioden juni-augusti på www.smhi.se. Resultat från provtagningarna kan hämtas från SMHI:s databas på sharkweb.smhi.se. Hydrografidata läggs ut varje månad, växtplanktondata läggs ut en gång per år.

About AlgAware

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 SMHIs satellite monitoring of algal blooms is found on www.smhi.se during the period June-August. Results from the expeditions are found in the SMHI database, sharkweb.smhi.se. Data are published monthly, phytoplankton data however, are published once a year.

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, 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.
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 (0-10 m) vid de olika stationerna. Pil upp eller ned indikerar om resultatet är över eller under en standardavvikelse från medel. Medel är beräknat utifrån aktuell månad under perioden 2001-2015. 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 (0-10 m) at sampling stations. The arrow up or down indicate whether the result is above or below one standard deviation from mean. The mean value is calculated using results from the actual month during the period 2001-2015. Presence of harmful algae at stations where species analysis is performed is shown with a symbol.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