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SMHI

Oceanographic Unit
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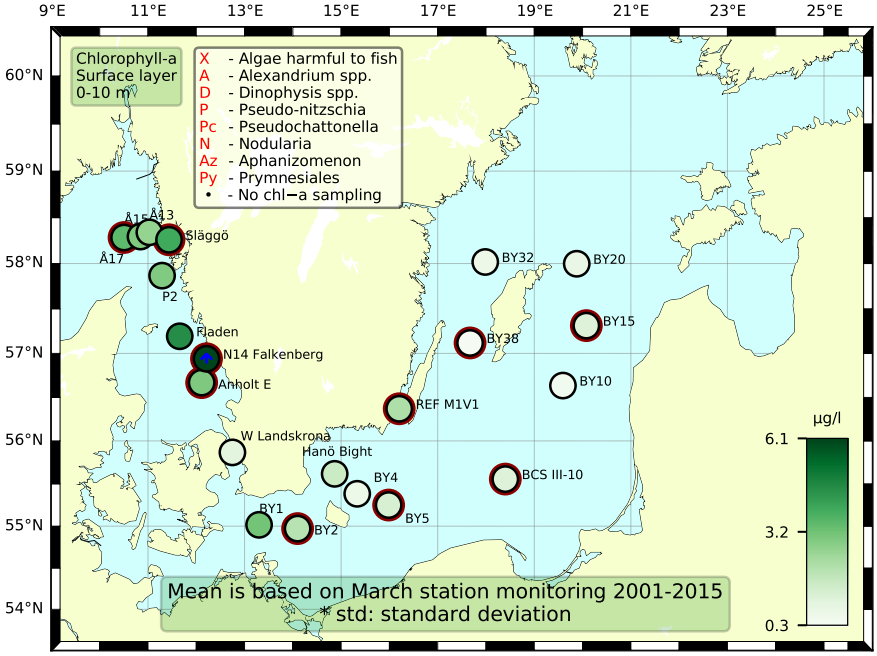
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Vid Å17, längst ut i Skagerrak, var artdiversiten och den totala cellkoncentrationen hög vilket visade att vårblomningen var igång. Station Släggö vid kusten hade lägre artdiversitet av växtplankton och den totala cellkoncentrationen var något lägre. Samhällena vid de båda stationerna i Skagerrak dominerades av kiselalger, men relativt många dinoflagellater förekom också. Klorofyllhalterna var inom det normala för månaden. Vid N14 Falkenberg och Anholt E i Kattegatt var de totala cellkoncentrationerna höga och dominerades av kiselalger. Vid N14 Falkenberg var klorofyllhalterna över det normala för månaden i de integrerade värdena (0-10m samt 0-20m) detta var speciellt tydligt i det ytliga skiktet (0-10m). Vid Anholt E var klorofyllhalterna normala för månaden och relativt höga koncentrationer återfanns på 30-50 meters djup, vilket antyder att vårblomningen så smått höll på att avslutas och börjat sjunka.

Växtplanktonsituationen i Östersjön var mer eller mindre densamma denna månad som den var i februari, alltså få arter i låga cellantal. Det var också ungefär samma arter som observerades, ett fåtal celler av dinoflagellaten *Peridiniella catenata* och kiselalgen *Chaetoceros castracanei* fanns vid BY2, den trådlika cyanobakterien *Aphanizomenon flosaquae* fanns i förhöjd mängd vid BCSIII-10 och BY15 och grönalgen *Binuclearia lauterbornii* fanns vid alla stationer förutom BCSIII-10. Kolonibildande pico cyanobakterier hade ökat i antal kolonier och arter jämfört med månaden innan. Klorofyllhalterna var normala för denna månad.



Abstract

At Å17, the most westerly Skagerrak station, the diversity and the total cell concentration were both high and presented a spring bloom situation. At Släggö, at the coast, the phytoplankton diversity and chlorophyll concentrations were a bit lower but still indicated a spring bloom. Diatoms dominated the community at both stations, but high cell numbers of dinoflagellates were also found. The chlorophyll concentrations were within normal for the month and indicated that the spring bloom was ongoing. At station N14 Falkenberg the integrated chlorophyll concentrations (0-10m and 0-20m) were above normal and more so in the upper interval, 0-10m. At Anholt E the highest chlorophyll concentrations were found at 30-50 meters depth which indicated that the spring bloom was at its end and the cells were sinking.

The phytoplankton situation in the Baltic was more or less the same as the month before, a few species in low cell numbers. Also the species were the same as the ones observed last month, a few cells of the dinoflagellate *Peridiniella catenata* and the diatom *Chaetoceros castracanei* were found at BY2, the threadlike cyanobacterium *Aphanizomenon flosaquae* was common at BCSIII-10 and BY15 and the green algae *Binuclearia lauterbornii* was observed at all stations except at BCSIII-10. Colony forming pico cyanobacteria were found in enhanced numbers of cells and species compared to February. The chlorophyll concentrations were normal for this month.

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

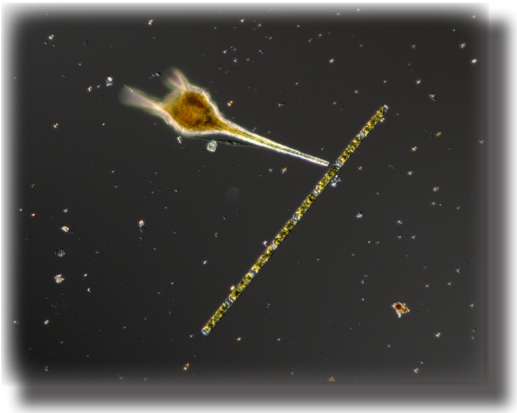
The Skagerrak

Å17 (open Skagerrak) 17th of March

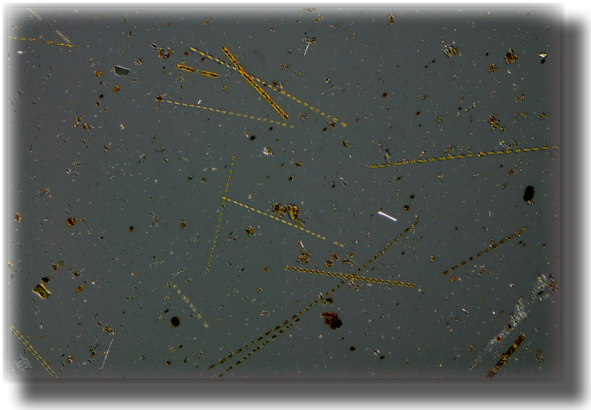
The phytoplankton diversity and the total cell concentrations were both high. Diatoms dominated and among these *Skeletonema marinoi* and *Guinardia delicatula* were the most abundant. Many dinoflagellates were found in moderate cell numbers such as different species of the genus *Tripos* as well as *Karenia mikimotoi**. The integrated chlorophyll concentrations (0-10m and 0-20m) were within normal for this month and indicated an ongoing spring bloom.

Släggö (Skagerrak coast) 17th of March

The phytoplankton diversity and the total cell concentrations were a bit more moderate. Among the diatoms, *Skeletonema marinoi* was found in the highest cell numbers. The dinoflagellate *Karenia mikimotoi** was found with quite high cell numbers. The integrated chlorophyll concentration (0-20m) was normal for this month and indicated that the spring bloom was ongoing.



The phytoplankton community in the Skagerrak was dominated by diatoms, but contained many dinoflagellates as well. Both *Guinardia delicatula* (right) and *Tripos lineatus* (left) were common. Photo: M. Johansen.



At Anholt E, a bloom situation was found but the amount of detritus and high chlorophyll values at 30-50 meters depth indicated that the bloom was at a late stage. Photo: M. Johansen.

Anholt E 16th of March

Both the phytoplankton diversity and the total cell concentrations were relatively high. The phytoplankton community was dominated by diatoms. The diatom *Skeletonema marinoi* was found with the highest cell numbers but *Guinardia delicatula* and *Pseudo-nitzschia** were also abundant. Different species of the dinoflagellate genus *Tripos* were common among the dinoflagellates. Some single cells of the genus *Phaeocystis* were also found. The integrated chlorophyll concentrations (0-10m and 0-20m) were within normal. Quite high chlorophyll concentrations were found at 30-50 meters depth and a lot of detritus was noted in the phytoplankton sample which indicated that the spring bloom was at the end with cells starting to degrade and sink.

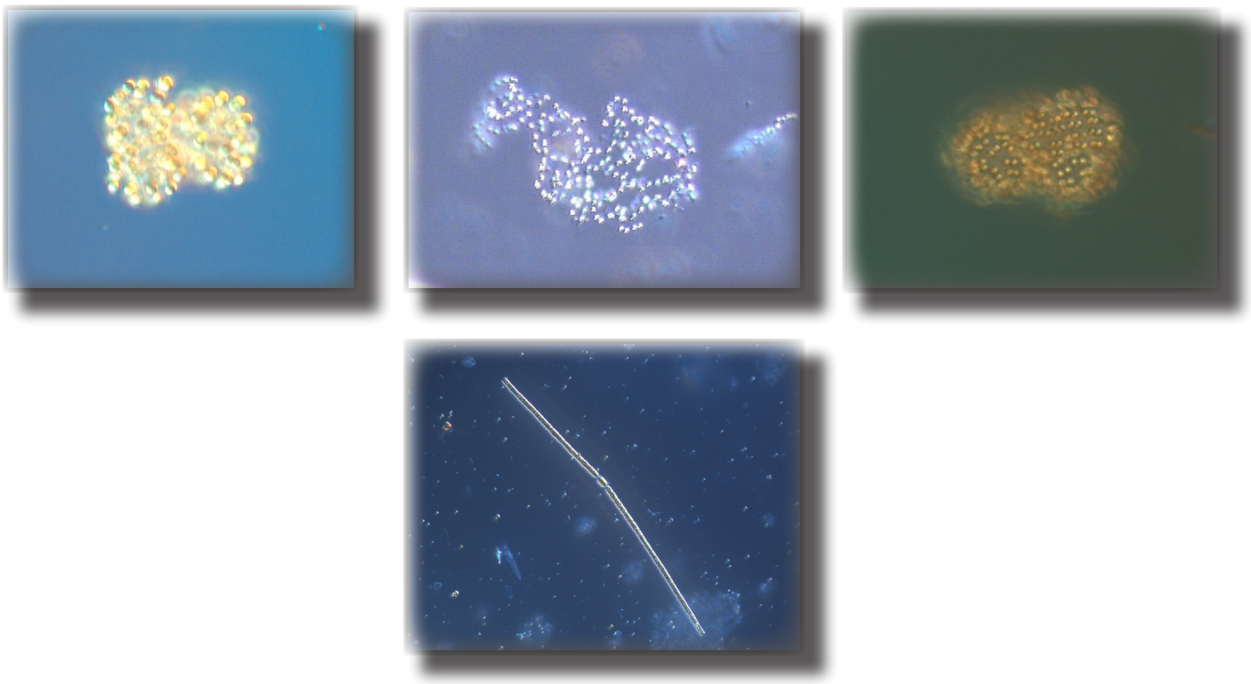
N14 Falkenberg 16th of March

Both the phytoplankton diversity and the total cell concentrations were high. The phytoplankton community was dominated by diatoms. The diatom *Skeletonema marinoi* was found with the highest cell numbers but *Guinardia delicatula* was also abundant. The integrated chlorophyll concentrations (0-10m and 0-20m) were above normal for this month, especially in the surface (0-10).

The Baltic

A somewhat larger amount of species was found in the Baltic phytoplankton samples compared to last month, but the cell numbers and chlorophyll concentrations were still very low.

No further information is provided from the Baltic due to the low amounts of phytoplankton.

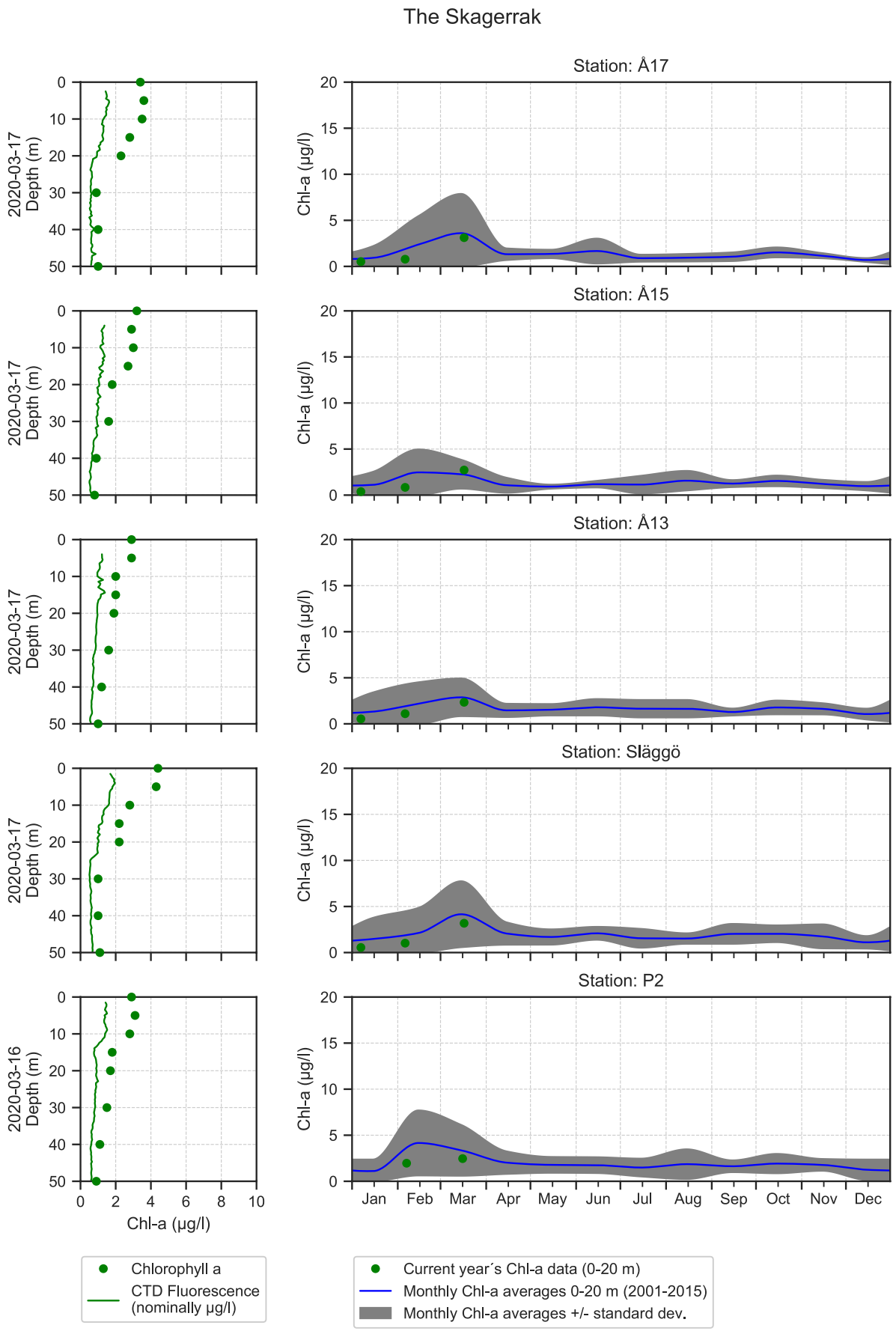


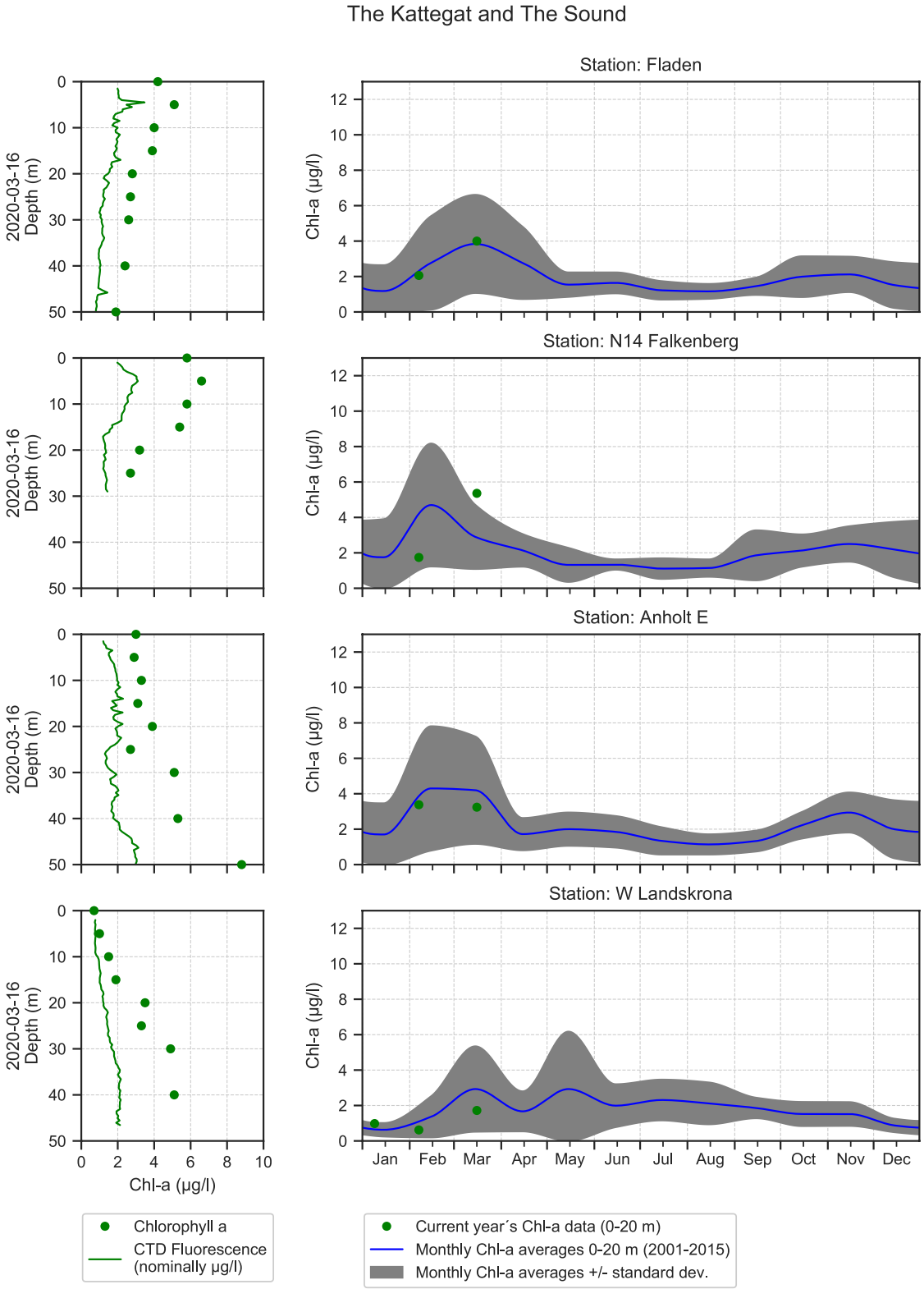
Colony forming pico cyanobacteria (upper photos) were present at all of the Baltic stations, *Aphanizomenon flosaquae* (lower photo) was present at BCSIII-10 and at BY15. Photos: A-T Skjevik.

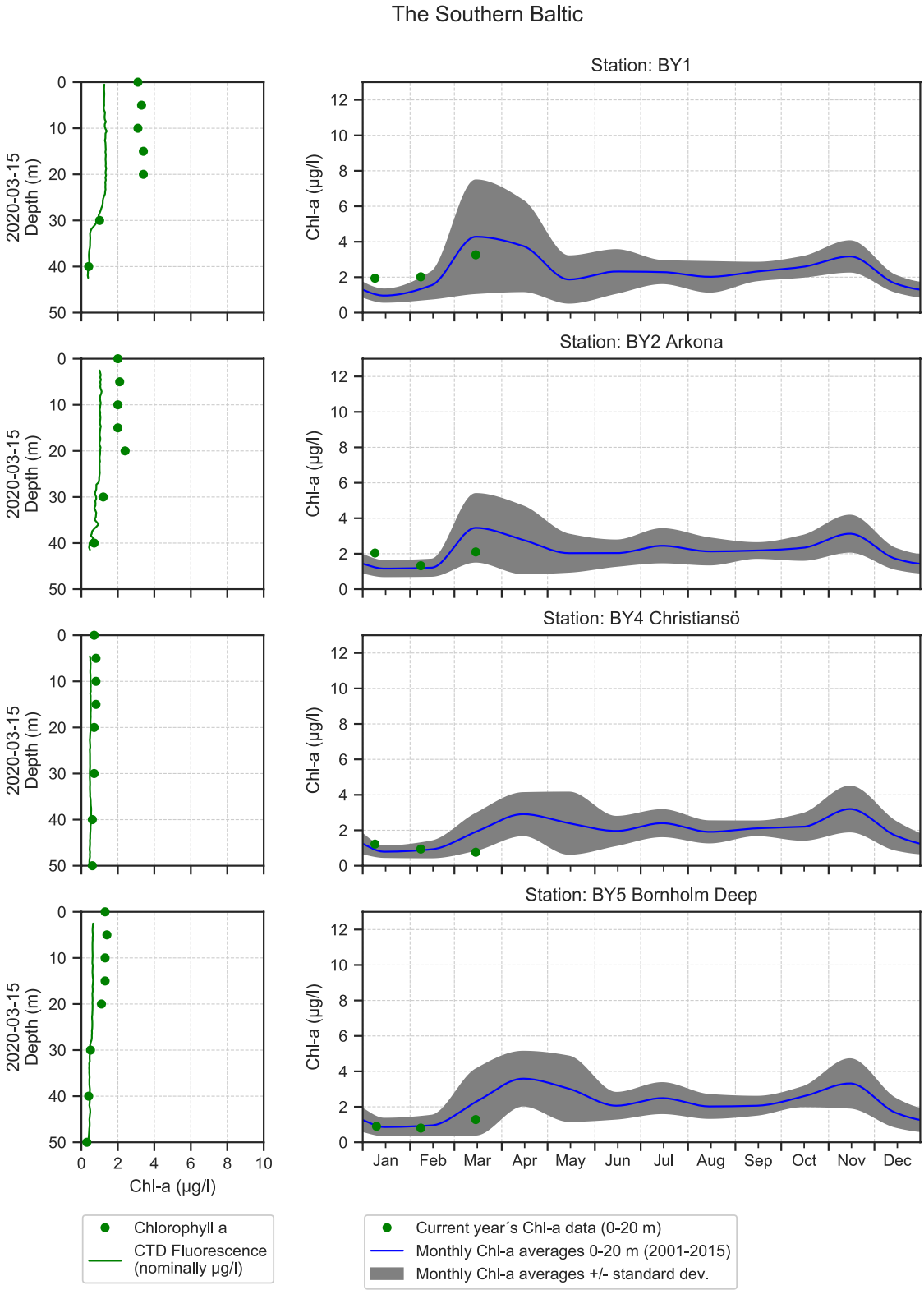
Phytoplankton analysis and text:
Ann-Turi Skjevik and Marie Johansen

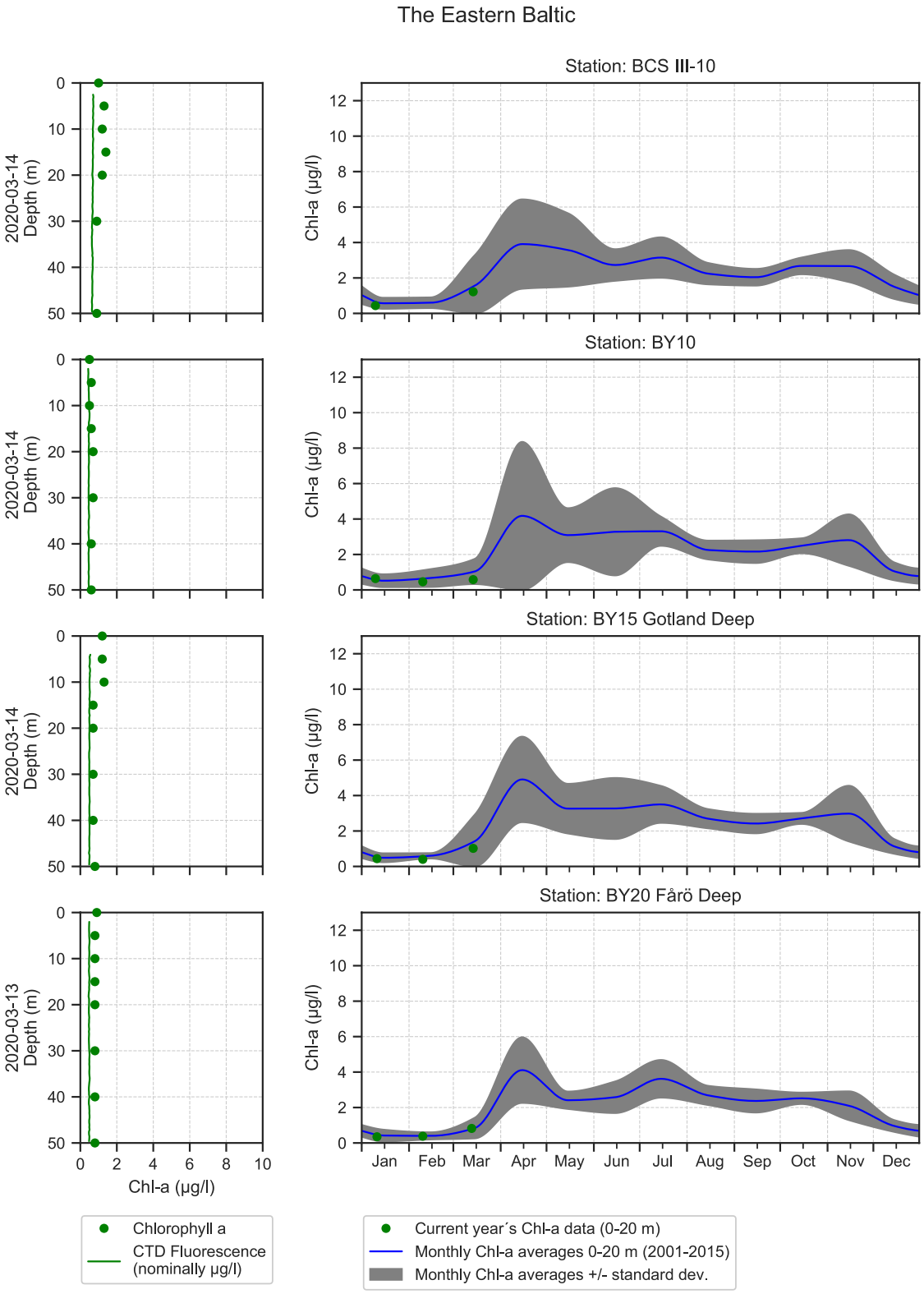
Selection of observed species	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	16/3	16/3	17/3	17/3
Hose 0-10 m	presence	presence	presence	presence
Centrales	present	common	common	present
Chaetoceros		present	present	
Chaetoceros debilis		present		
Chaetoceros subtilis				present
Coscinodiscus radiatus	present	present		
Dactyliosolen fragilissimus			present	present
Eucampia zodiacus				present
Guinardia delicatula	very common	very common	very common	very common
Guinardia flaccida	common	common	present	present
Leptocylindrus minimus			present	
Nitzschia longissima				present
Proboscia alata	present	present	present	
Pseudo-nitzschia	very common	present	present	
Pseudo-nitzschia cf. seriata	present	common		present
Rhizosolenia hebetata f. semispina	present	present	present	present
Rhizosolenia setigera	present		present	present
Skeletonema marinoi	very common	dominating	present	very common
Thalassiosira		present		present
Thalassiosira angulata				common
Thalassiosira anguste-lineata				present
Thalassiosira gravida		present		present
Thalassiosira nordenskioeldii		present		
Tripos bucephalus				present
Tripos fusus	present			present
Tripos horridus				present
Tripos lineatus	present		present	common
Tripos longipes		present	present	present
Tripos macroceros				present
Tripos muelleri	present	present		present
Dinophysis norvegica		present	present	present
Diplopsalis	present		present	
Gymnodiniales	common	common	common	
Gyrodinium spirale		present		
Heterocapsa rotundata		present		
Karenia mikimotoi	present		present	common
Peridiniales		present		present
Peridiniella danica		present	present	
Protoperidinium	present		present	
Protoperidinium bipes			present	present
Protoperidinium depressum			present	
Dictyocha speculum	present		present	
Pseudopedinella pyriformis		common	present	
Pyramimonas			present	present
Emiliania huxleyi	present			present
Phaeocystis	common		present	present
Heterosigma akashiwo		present		present
Cryptomonadales	common	common		present
Leucocryptos marina			present	
Choanoflagellatea	present			
Ciliophora	present	common	present	common
Mesodinium rubrum			present	

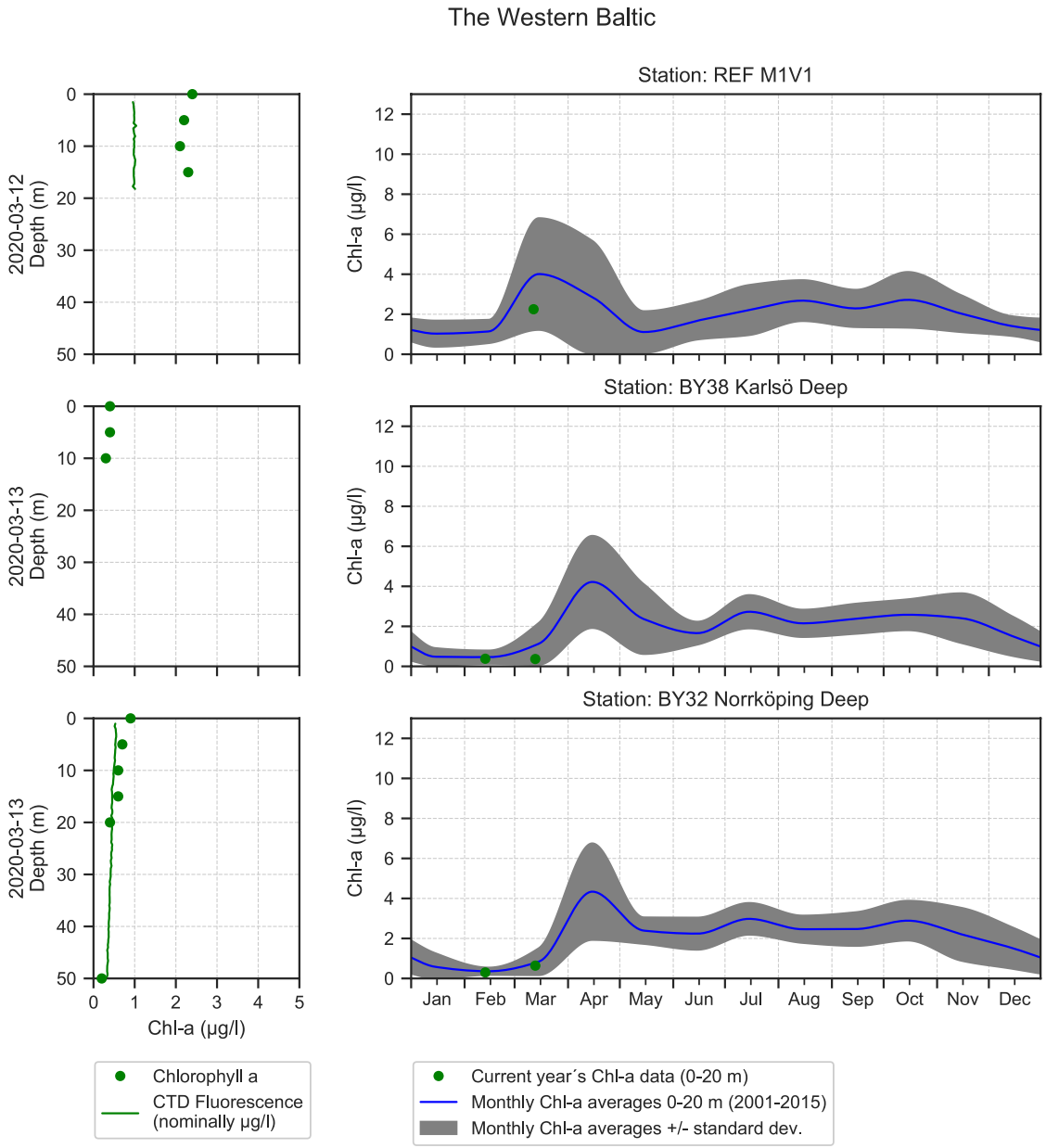
Selection of observed species	BCSIII-10	BY15	BY2	BY38	BY5
Red=potentially toxic species	14/3	13/3	15/3	13/3	15/3
Hose 0-10 m	presence	presence	presence	presence	presence
Attheya septentrionalis			present		
Chaetoceros castracanei			present		present
Chaetoceros similis			present		
Chaetoceros subtilis			present		present
Dactyliosolen fragilissimus			present		
Guinardia delicatula	present				
Navicula			present		
Nitzschia longissima		present		present	
Skeletonema marinoi	present	present	present	present	present
Thalassiosira	present				present
Amphidinium crassum			present		
Dinophysis acuminata	present	present		present	present
Gymnodiniales	present	present	present	present	present
Heterocapsa	present	present	present		present
Heterocapsa rotundata	present		present		present
Heterocapsa triquetra			present		
Katodinium glaucum			present		
Peridiniales	present	present		present	present
Peridiniella catenata	present	present		present	present
Eutreptiella	present	present	present	present	present
Aphanizomenon flosaquae	common	common			
Aphanothece paralleliformis		present			
Cyanodictyon	present	present	present	present	present
Lemmermanniella	present	present	present	present	present
Snowella	present	present	present		present
Binuclearia lauterbornii		present	present	present	present
Cryptomonadales	present	present	common	present	present
Leucocryptos marina	present				
Monoraphidium		present			
Pseudopedinella	present				present
Prymnesiales	present	present			
Prymnesium polylepis					present
Pterosperma					present
Pyramimonas	present		present	present	
Oocystis	present	present	present		present
Ebria tripartita			present	present	
Calliacantha natans	present		present	present	present
Ciliophora	common	present	present	present	present
Mesodinium rubrum	present	present	present	present	present
Strombidium	present				


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2020-03-17
2020-03-16
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
2020-03-16
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
2020-03-15
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
2020-03-14
2020-03-13
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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