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SMHI
Oceanographic Unit
No 3, March 2021

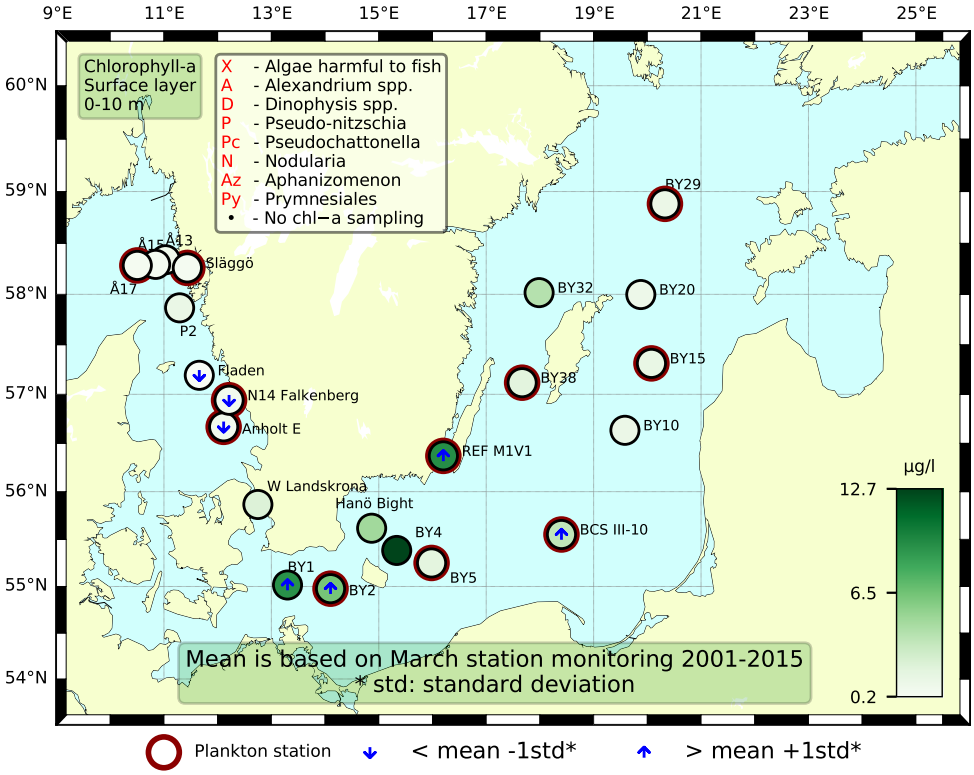
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Vårblomningen var i princip över på svenska västkusten och det var mest små celler kvar och enstaka arter dinoflagellater. Vid de södra stationerna fanns fortfarande en del kiselalger kvar. Klorofyllvärdena var låga vid stationerna i Skagerak och under normalt vid Kattegatt.

I den sydvästra delen av Östersjön var blomningen i full gång med dominans av kiselalgen *Skeletonema marinoi*. Vid övriga stationer var förekomsten av celler inom det normala och ingen antydan av vårblomning återfanns. Den filamentösa cyanobakterien *Aphanizomenon flosaquae* återfanns vid flertalet stationer. De integrerade klorofyllvärdena var väl över det normala vid de sydvästra stationerna. Vid övriga stationer var då med få undantag låga men inom det normala vid övriga stationer.



Abstract

The spring bloom was generally over at the Swedish west coast and mostly smaller cells and a few species of dinoflagellates were left. At the southern stations some diatoms were present. The chlorophyll concentrations were low at the Skagerrak stations but below normal at Kattegat stations.

In the south-western part of the Baltic a clear spring bloom was recorded with a dominance of *Skeletonema marinoi*. At the other stations the cell numbers were more moderate with no tendency of a spring bloom. The filamentous cyanobacteria *Aphanizomenon flosaquae* was found at most stations in lower numbers. The integrated chlorophyll concentrations were well above normal in the south-western part. At the other stations they were with few exceptions low but within 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) 22nd of March
Both phytoplankton diversity and abundance were relatively high, but the community consisted mainly of smaller cells such as Cryptomonadales, *Heterocapsa rotundata*, *Pyramimonas* sp., *Pseudopediniella* sp., Choanoflagellatea and ciliates. Just a few larger dinoflagellates were present. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within normal for this month.

Släggö (Skagerrak coast) 22nd of March
Both phytoplankton diversity and abundance were relatively high, but the community consisted mainly of smaller cells such as Cryptomonadales, *Pseudopediniella* sp., Choanoflagellatea and ciliates. A few larger dinoflagellates were present, such as *Protoperidinium pellucidum*, Gymnodiniales and the potentially toxic species *Dinophysis acuminata** and *D. norvegica**. The integrated (0-10 m) chlorophyll concentrations was low but within normal for this month, while (0-20 m) were lower than normal.

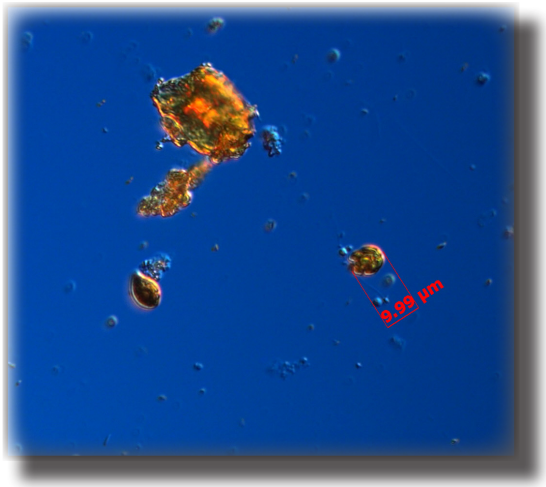


Figure 1: Both Cryptomonadales (left) and *Pseudopediniella* sp. were numerous along the Swedish west coast in March. Photo: A-T Skjevik.

The Kattegat

Anholt E 21st of March
Both phytoplankton diversity and abundance were relatively high. The community consisted of smaller cells such as Cryptomonadales, *Pseudopediniella* sp., Choanoflagellatea and ciliates, as well as larger species of dinoflagellates and diatoms; *Guinardia delicatula*, *Rhizosolenia hebetata f. semispina*, a few *Skeletonema marinoi*, Gymnodiniales, *Gyrodinium spirale* and *Protoperidinium pellucidum* as well as the potentially toxic species, *Alexandrium pseudogonyaulax**, *Dinophysis acuminata** and *D. norvegica**. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were lower than normal for this month.

N14 Falkenberg 21st of March
Both phytoplankton diversity and abundance were relatively high. The community consisted of smaller cells such as Cryptomonadales, *Pseudopediniella* sp., Choanoflagellatea and ciliates, as well as larger species of dinoflagellates and diatoms; *Guinardia delicatula*, *Rhizosolenia hebetata f. semispina*, a few *Skeletonema marinoi*, Gymnodiniales, *Gyrodinium* spp. and *Protoperidinium pellucidum* as well as the potentially toxic species *Dinophysis acuminata** and *D. norvegica**. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were lower than normal for this month.

The Baltic

BY2 20th of March
Phytoplankton diversity was relatively high and abundance were high. The diatom *Skeletonema marinoi* dominated in cell numbers. Among the smaller cells the diatom *Attheya septentrionalis*, *Chaetoceros subtilis* and different cryptomonadales were also common. At the nearby station BY1 a similar bloom situation was found. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were above normal for this month.

BY5 19th of March
Both phytoplankton diversity and total abundance were low. There was however high cell numbers of the filamentous cyanobacteria *Aphanizomenon flosaquae*, the chain forming dinoflagellate *Peridiniella catenata* and the ciliate *Mesodinium rubrum*. The diatom *Skeletonema marinoi* was also found in higher cell numbers. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month. Worth mentioning is that at the nearby station BY4 a definite spring bloom was ongoing with chlorophyll values well above normal at the integrated depth 0-20 meters.

BCSIII-10 19th of March
Both phytoplankton diversity was low and total abundance were moderate. Small cells dominated. There were however high cell numbers of different species belonging to the order cryptomonadales and colonies of *Snowella* sp. The diatom *Skeletonema marinoi* was also found in higher cell numbers. The integrated chlorophyll (0-10 m) was above normal and the integrated chlorophyll (0-20 m) were almost above normal for this month.

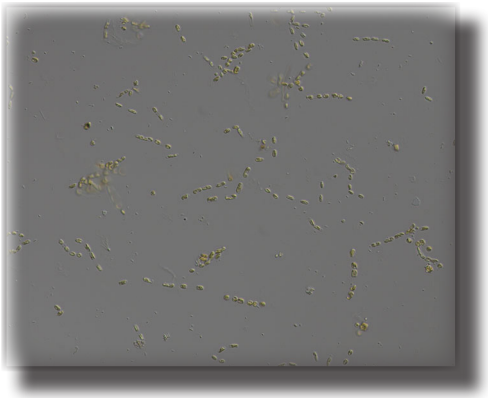


Figure 2: Spring bloom dominated by the diatom *Skeletonema marinoi* was observed in the southwestern Baltic Sea. Photo: M. Johansen.

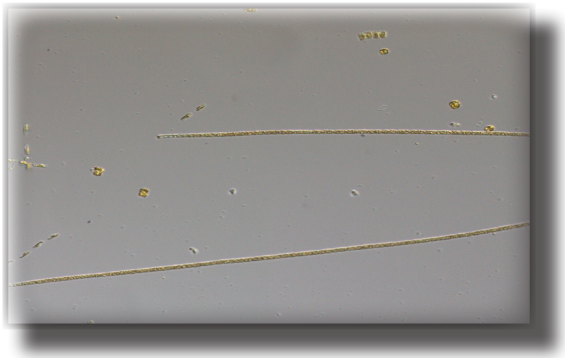


Figure 3: A few filaments of the cyanobacteria *Aphanizomenon flosaquae* was found at several stations in the Baltic. Photo: M. Johansen.

BY15 18th of March
Both phytoplankton diversity and total abundance were low. There was however high cell numbers of the filamentous cyanobacteria *Aphanizomenon flosaquae*, the chain forming dinoflagellate *Peridiniella catenata* and the ciliate *Mesodinium rubrum*. The diatom *Skeletonema marinoi* was also found in higher cell numbers. *Snowella* sp. was however numerous Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

BY29 18th of March
This station had low diversity and abundance. The dinoflagellate *Peridiniella catenata* and the diatom *Skeletonema marinoi* dominated among the larger cells. The ciliate *Mesodinium rubrum* was also common. The smaller cells had a dominance of *Eutreptiella* spp. No results of chlorophyll were available for this station.

BY31 17th of March
Both phytoplankton diversity and abundance were moderate. There was highest cell numbers of the diatom *Skeletonema marinoi*. Other more common species were *Mesodinium rubrum*., different species of the diatom genus *Chaetoceros* and *Eutreptiella spp*..

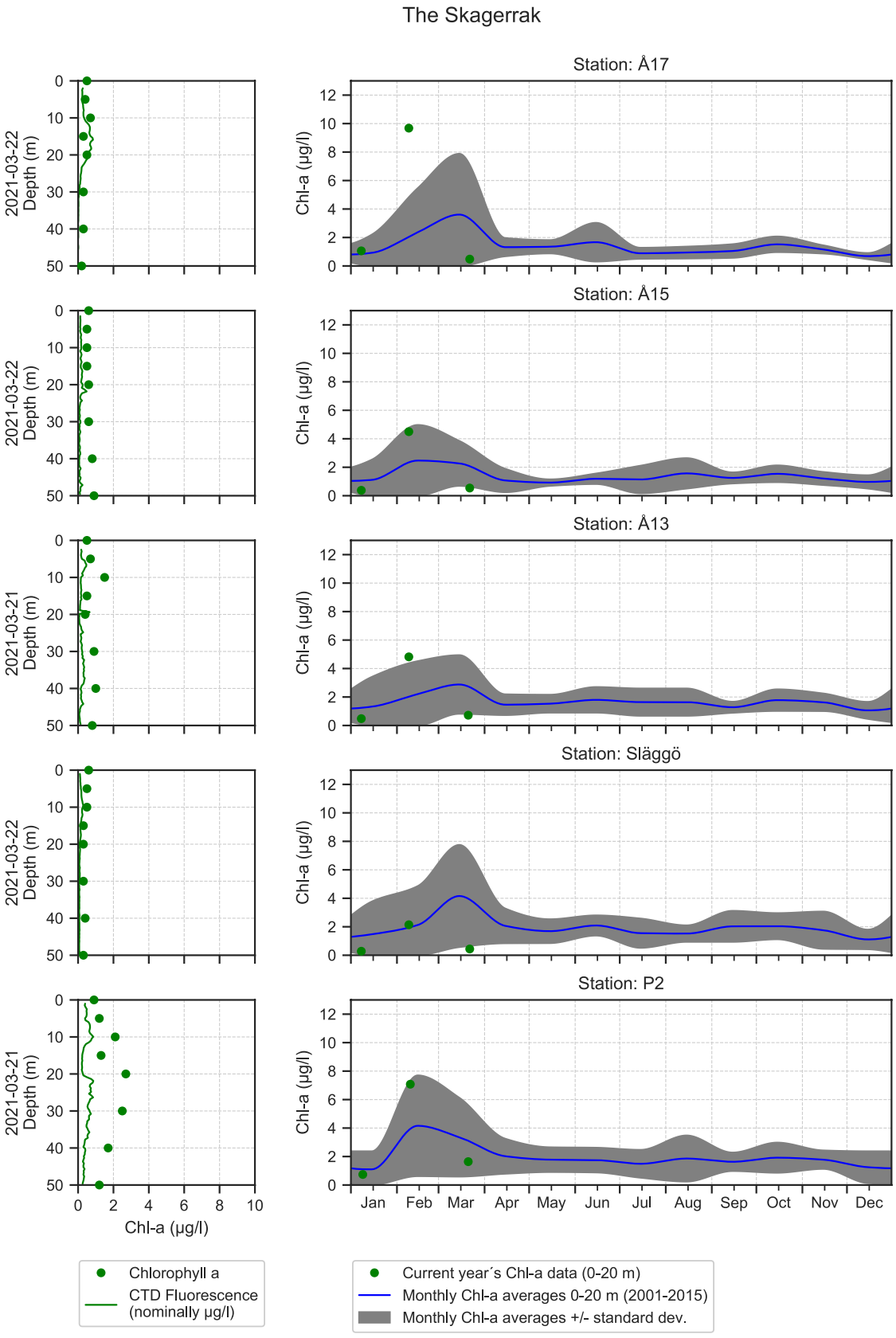
BY38 17th of March
Both phytoplankton diversity and abundance were very low. A few chains of *Skeletonema marinoi* and *Peridiniella catenata* were present. Among the smaller cells, different species of cryptomonadales were also found together with the colony forming cyanobacterium genus Snowella. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

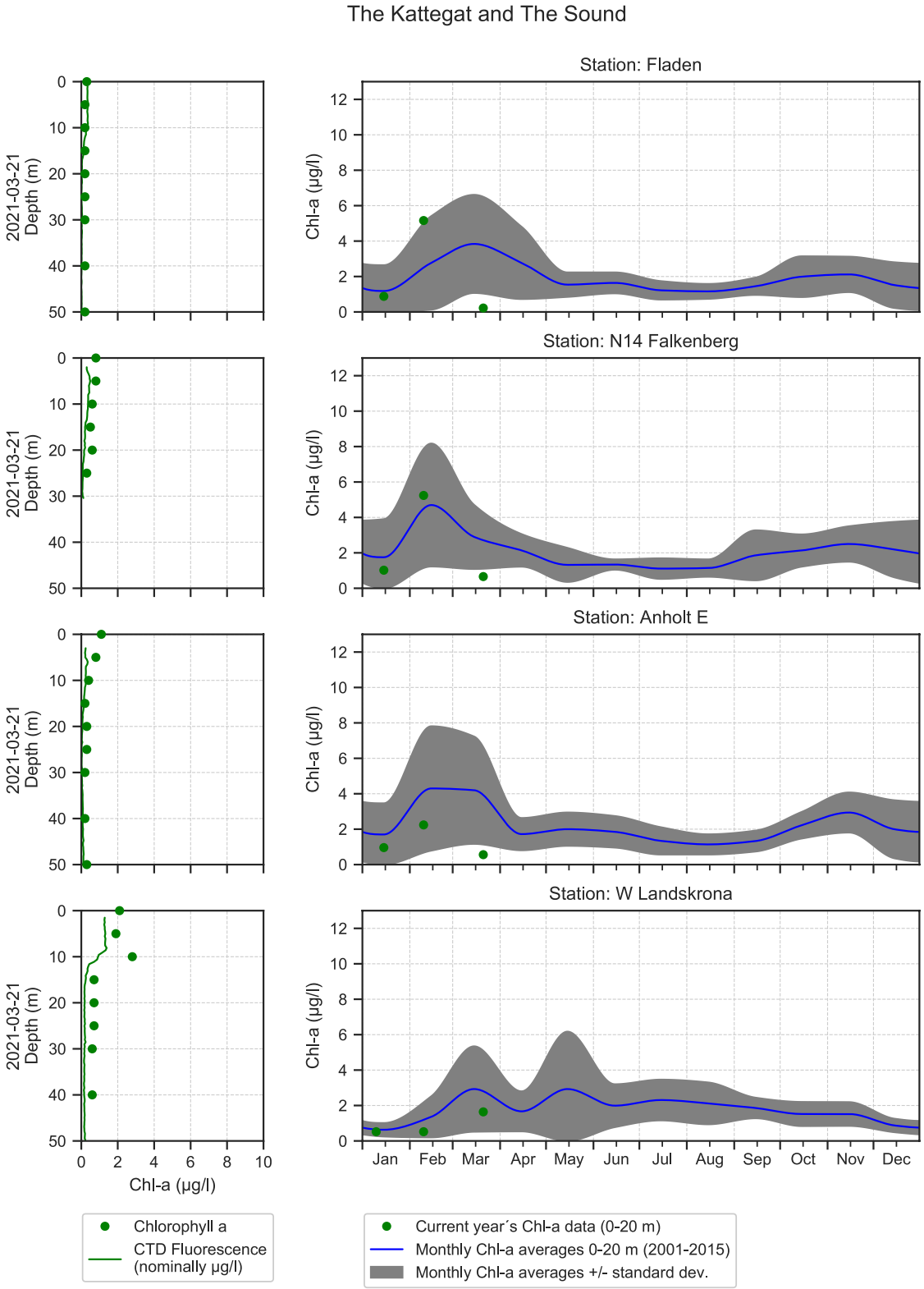
REFM1V1 16th of March
Phytoplankton diversity was moderate but the total abundance was high. A clear domination of the chain forming diatom *Skeletonema marinoi* was recorded indicating an ongoing sprinbloom. Among other more commonly found cells were *Mesodinium rubrum*, *Melosira arctica* and *Peridiniella catenata*. Among the smaller cells, different species of cryptomonadales were found in highest numbers. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were above normal for this month.

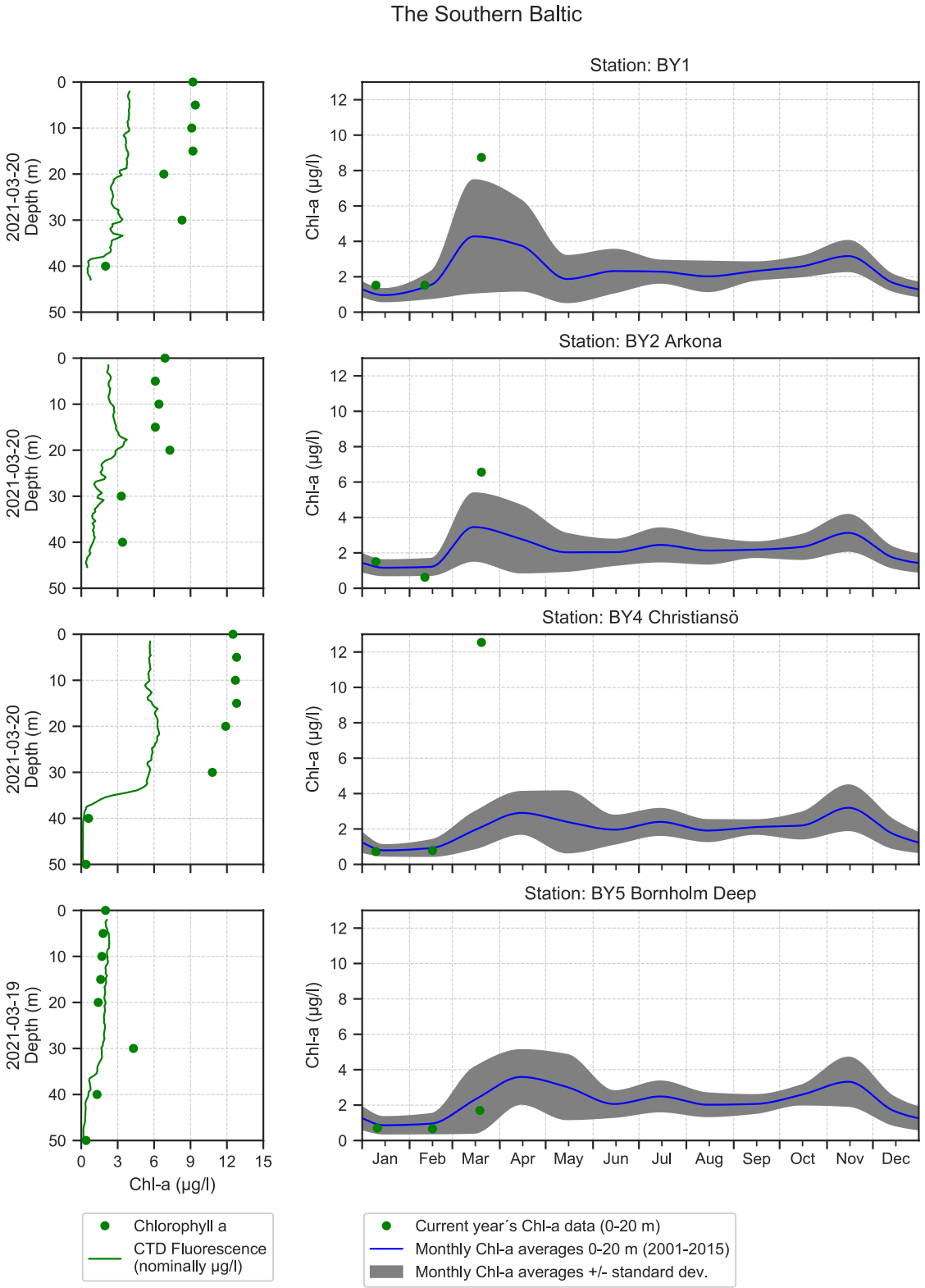
Phytoplankton analysis and text:
Marie Johansen and Maria Karlberg

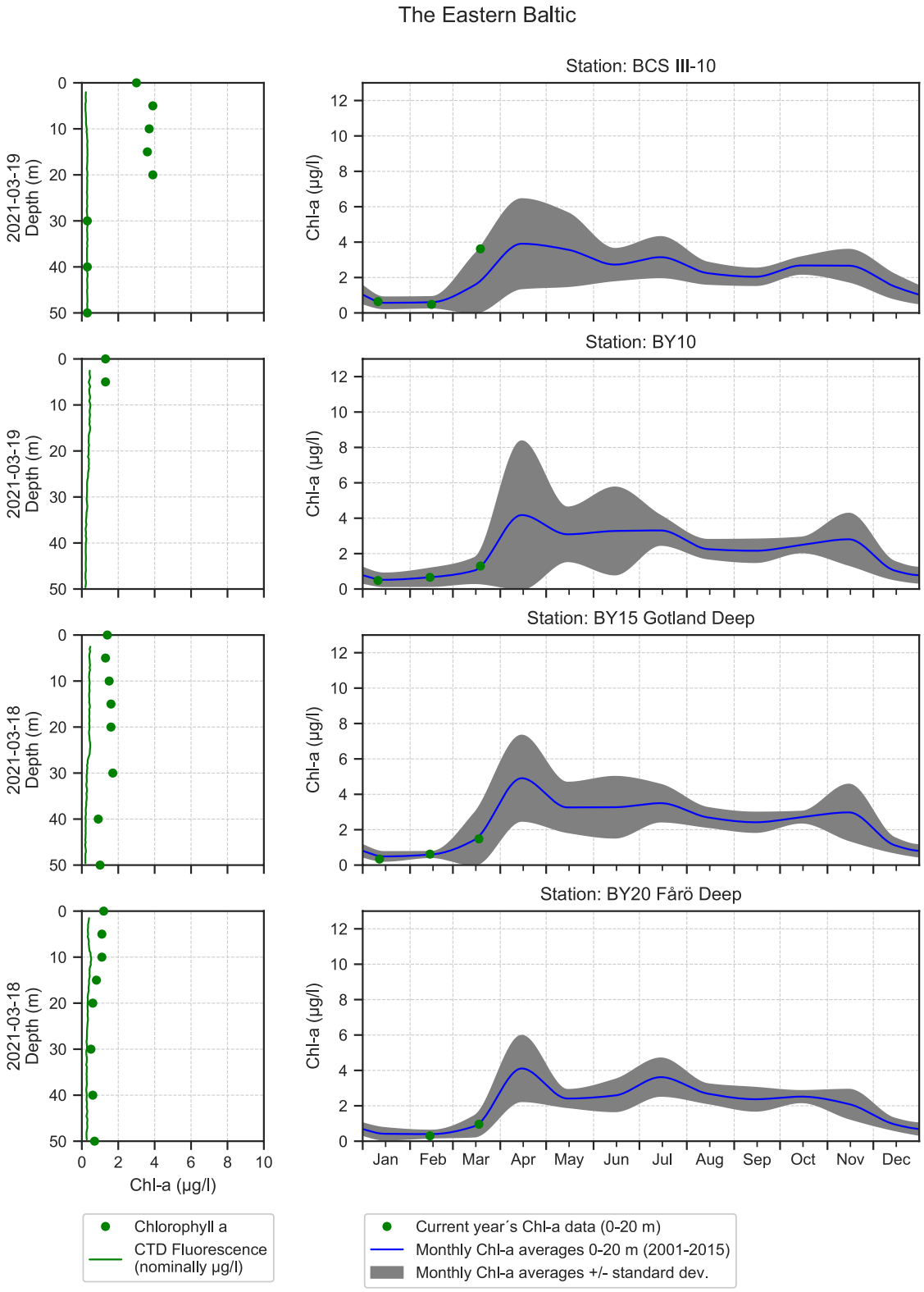
Selection of observed species	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	21/3	21/3	22/3	22/3
Hose 0-10 m	presence	presence	presence	presence
Attheya septentrionalis	present			
Coscinodiscus radiatus	present	present		present
Guinardia delicatula	common	present		
Licmophora			present	
Proboscia alata	present	present	present	
Pseudo-nitzschia		present		
Rhizosolenia hebetata f. semispina	present	present		
Skeletonema marinoi	present	present		present
Thalassiosira			present	
Alexandrium pseudogonyaulax	present			
Dinophysis acuminata	common	common	present	
Dinophysis norvegica	common	common	common	
Gymnodiniales	very common	very common	common	present
Gymnodinium verruculosum	common	present	present	
Gyrodinium			present	
Gyrodinium flagellare		present	present	present
Gyrodinium fusiforme	present	present		
Gyrodinium spirale	common	present	present	present
Heterocapsa rotundata	present		present	common
Katodinium glaucum	present	present		
Peridiniales	common	common		present
Peridiniella danica	common	present		present
Phalacroma rotundatum		present		
Protoperidinium	common		present	
Protoperidinium bipes	present	present	present	
Protoperidinium oblongum	present	present	present	
Protoperidinium pellucidum	common	very common	common	present
Scrippsiella CPX	present	present	present	
Tripos longipes		present		
Tripos muelleri	present	present	present	present
Ollicola vangoorii	present		present	
Emiliania huxleyi				present
Pyramimonas	common	common	present	common
Cryptomonadales	very common	very common	very common	very common
Leucocryptos marina	present	common	present	
Octactis speculum	present		present	
Pseudopedinella	common	very common	common	common
Pseudanabaena	present	present		present
Calliacantha natans	present	common	common	common
Choanoflagellatea	very common	common	very common	common
Ciliophora	very common	very common	common	common
Mesodinium rubrum			present	
Flagellates	common	very common	very common	common
Tintinnopsis	present			
Tintinnopsis beroidea		present	present	
Unicell	common	common	common	common

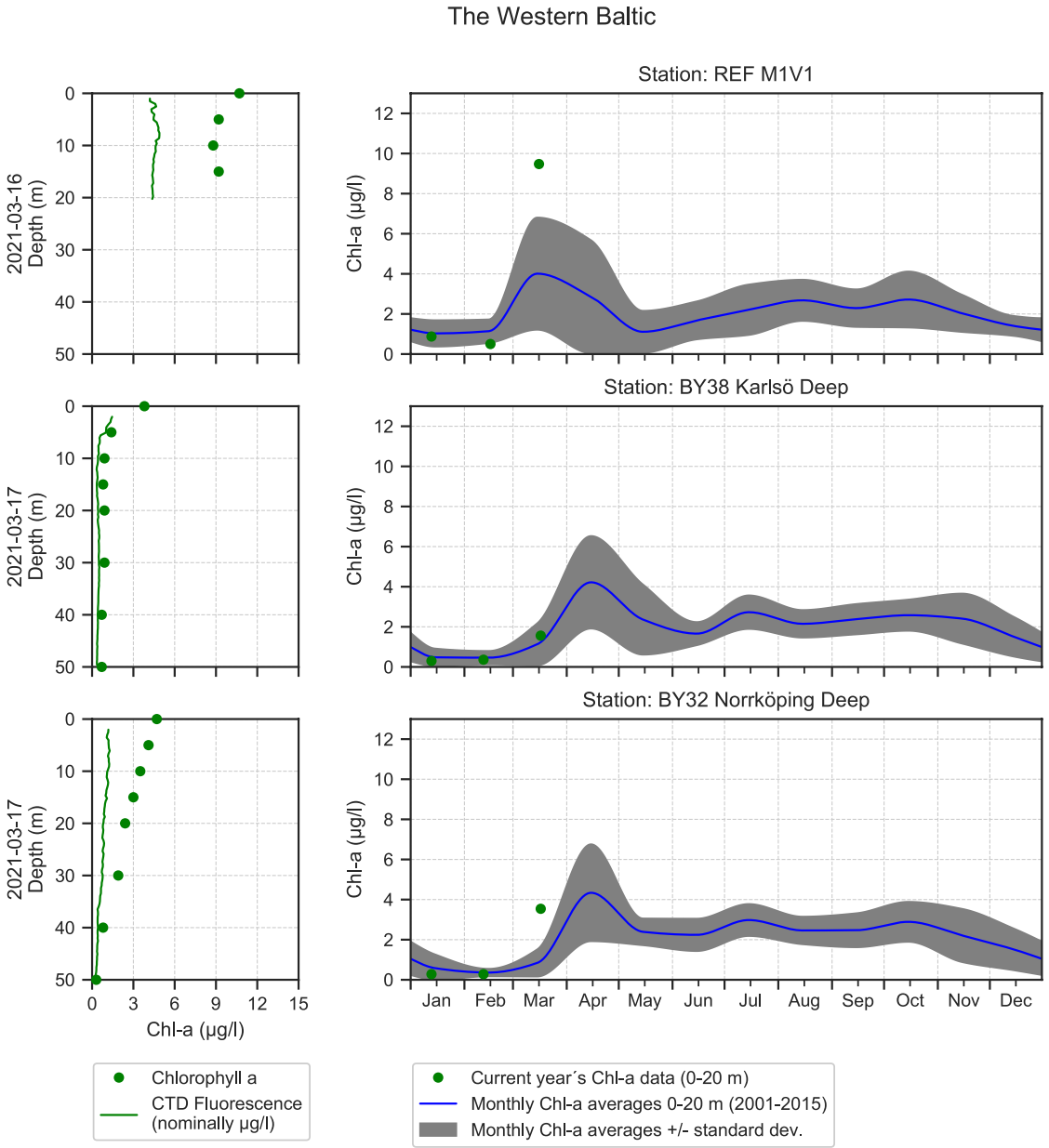
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY29	BY31	BY38	REFM1V1
Red=potentially toxic species	19/3	20/3	19/3	18/3	18/3	17/3	17/3	16/3
Hose 0-10 m	presence	presence	presence	presence	presence	presence	presence	presence
Attheya septentrionalis		common						
Centrales			present					common
Chaetoceros		present		present	present	common		present
Chaetoceros danicus				present		present		
Chaetoceros cf. holsaticus					present			present
Chaetoceros similis		present			present	present		
Chaetoceros subtilis		common	common					
Chaetoceros wighamii				present	present	present		present
Melosira arctica			present		present			common
Nitzschia longissima								present
Skeletonema marinoi	common	very common	very common	common	common	very common	common	very common
Thalassiosira			present			present	present	present
Thalassiosira baltica			present					present
Amphidinium	present		present			present	present	
Amphidinium sphenoides		present		present	present			
Dinophysis acuminata	present			present	present		present	
Gymnodiniales	present	present	common	present	present	present	common	present
Gyrodinium spirale			present				present	
Heterocapsa		common					present	
Heterocapsa rotundata		present						
Katodinium glaucum			present					
Peridiniales		present		present	present	present		common
Peridiniella catenata	common	present	common	common	common	present	common	common
Protoperidinium		present	present		present	present		
Protoperidinium brevipes					present			
Protoperidinium pellucidum			present					
Dinobryon divergens			present					
Prymnesiales		present					present	
Monoraphidium					present			
Oocystis						present	present	
Binuclearia lauterbornii	common	present	present	present			present	
Cryptomonadales	common	common	common	common	present	common	common	common
Pseudopedinella pyriformis				present				
Eutreptiella					common	common	common	present
Aphanizomenon flosaquae	common			common	present	present		
Aphanocapsa					present			
Aphanothece				present				
Snowella	common	present	present	common	present	present	common	
Choanoflagellatea		present				common		
Ebria tripartita				present	present	present	present	
Ciliophora	present	common	common	present	present	present	common	present
Mesodinium rubrum	common	common	present	common	common	common	common	common


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2021-03-22
2021-03-21
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
2021-03-21
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
2021-03-20
2021-03-19
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
2021-03-19
2021-03-18
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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