SMHI
Oceanographic Unit
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AlgAware
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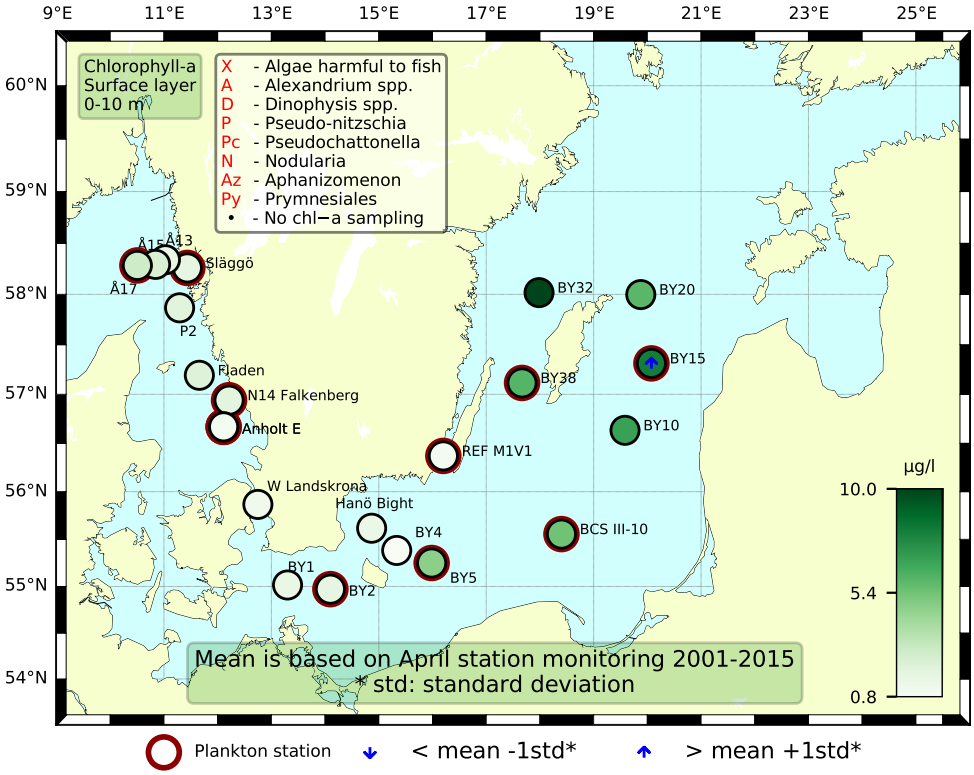
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Sammanfattning
Efter vårblomningen fanns det mest små celler kvar samt enstaka arter av dinoflagellater och kiselalger i både Kattegatt och Skagerrak. Flertalet arter och släkten av potentiellt giftiga växtplankton fanns längs hela västkusten i april. Klorofyllvärdena vid samtliga stationer var normala för månaden.

I den östra delen av Östersjön var vårblomningen i gång Även vid den södra stationen BY5 Bornholmsdjupet återfanns en liten vårblomningstopp. Vid den västliga stationen, BY38 Karlsödjupet, återfanns även höga cellantal. Samtliga stationer med höga cellantal dominerades av dinoflagellaten *Peridinella catenata*. Den filamentösa cyanobakterien *Aphanizomenon flosaquae* återfanns vid ett par stationer. Det integrerade klorofyllvärdena (0-10 m) var över det normala endast vid BY15 Gotlandsdjupet Vid övriga östliga stationerna var de integrerade klorofyllvärdena (0-10 m) höga men inom det normala för månaden. Vid de västliga stationerna var de låga efter förra månadens vårblomning.



Abstract
After the spring bloom there were mostly small cells left and a few dinoflagellates and diatoms in both Kattegat and Skagerrak areas. Several species and genera of potentially toxic phytoplankton were present along the whole west coast in April. Chlorophyll concentrations at all stations were normal for this month.

In the eastern part of the Baltic spring bloom was recorded. Station BY5 in the south also presented a small spring bloom. High cell numbers were found at BY38, between southern Gotland and northern Öland. All stations with high cell numbers had a dominance of the dinoflagellate *Peridinella catenata*. The filamentous cyanobacterium *Aphanizomenon flosaquae* was present at a couple of stations in low numbers. The integrated chlorophyll concentration (0-10 m) was above normal at BY15 Gotland deep. The rest of the eastern stations had high integrated chlorophyll values (0-10 m) but within normal for the month. At the westerly stations the chlorophyll concentrations were low due to the spring bloom the month before.

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

The Skagerrak

Å17 (open Skagerrak) 13th **of April**
Both phytoplankton diversity and abundance were low, and the community consisted mainly of small cells such as Cryptomonadales, *Pyramimonas* sp. and flagellates. There were also some *Heterocapsa rotundata*, Gymnodiniales, *Pseudopediniella* sp. and *Telonema* sp. Just a few large dinoflagellates were present and a few cells of the toxic diatom genus *Pseudo-nitzschia* sp*. The potentially harmful dinoflagellate *Karlodinium veneficum** was present. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

Släggö (Skagerrak coast) 13th of April
Both phytoplankton diversity and abundance were relatively high, but the community consisted mainly of small cells such as *Heterocapsa rotundata*, Cryptomonadales, *Pseudopediniella* sp. and ciliates. The diatom *Skeletonema marinoi* was abundant. A few large dinoflagellates and diatoms were present, as well as some potentially toxic species such as the dinoflagellates *Dinophysis acuminata**, *D. norvegica**, *Alexandrium* sp.* and *Karlodinium veneficum** and the diatom *Pseudo-nitzschia* sp.* Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

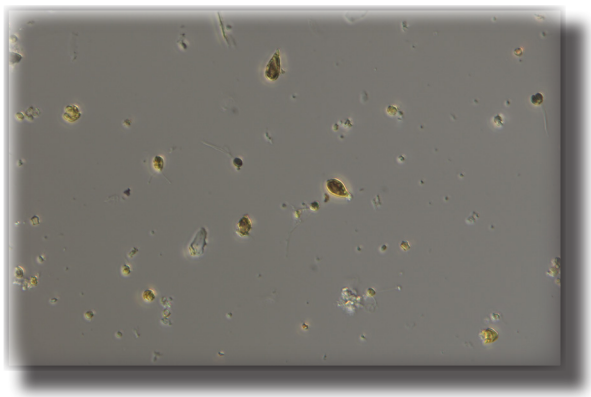


Figure 1. Small cells such as Cryptomonadales, *Pseudopediniella* sp. and *Heterocapsa rotundata* were numerous along the Swedish west coast in April. Photo: Maria Karlberg.

The Kattegat

Anholt E 14th and 19th of April
Both phytoplankton diversity and abundance were relatively normal. The community consisted of small cells such as Cryptomonadales, *Pseudopediniella* sp., *Heterocapsa rotundata* and flagellates, as well as a few *Skeletonema marinoi*, Gymnodiniales, *Peridiniella danica*. The potentially toxic species *Dinophysis acuminata**, *D. norvegica** and *Karlodinium veneficum** were present. The two sampling occasions at Anholt E were quite similar, there were however some differences: on the first occasion there were some more species of diatoms present and on the second occasion there were some more dinoflagellates. On the second sampling occasion there were also fewer cells of the small community and some more ciliates. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within normal for this month.

N14 Falkenberg 14th of April
Both phytoplankton diversity and abundance were relatively high. The community consisted of small cells such as Cryptomonadales, *Pseudopediniella* sp., *Peridiniella danica* and flagellates, as well as larger species of dinoflagellates and diatoms; *Guinardia delicatula*, *Rhizosolenia setigera*, a few *Skeletonema marinoi*, Gymnodiniales, and *Gyrodinium* spp. The potentially toxic species *Dinophysis acuminata**, *D. norvegica**, *Karlodinium veneficum** and *Protoceratium reticulatum** were present. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

The Baltic

BY2 15th of April

Phytoplankton diversity and total cell concentrations were low. Mainly small flagellates were present. Most common were the small dinoflagellate *Heterocapsa rotundata*, several cryptomonadales species and the genus *Dinobryon*. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

BY5 19[5h] of April

Phytoplankton diversity and total cell concentration were both relatively high. The dinoflagellate *Peridiniella catenata* dominated among the larger cells. The small cells were dominated by the genus *Dinobryon* and the cryptomonadales group. The ciliate *Mesodinium rubrum* was common. Both the integrated 0-20 m and 0-10 m chlorophyll concentrations were within normal for this month.

BCSIII-10 16th of April

The phytoplankton diversity was moderate whereas the total cell concentration was relatively high. The dinoflagellate *Peridiniella catenata* dominated. Also, the ciliate *Mesodinium rubrum* was present in high cell numbers. Among the small cells, cryptomonadales species were common and some colony forming cyanobacteria were present. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

Figure 2. A spring bloom dominated by the diatom *Peridiniella catenata* was present in the eastern part of the Baltic.
Photo: Ann-Turi Skjevik.

Figure 3. The small dinoflagellate *Heterocapsa rotundata* was common at several stations.
Photo: Ann-Turi Skjevik.

BY15 16th of April

The phytoplankton diversity was moderate and total abundance was relatively high. The dinoflagellate *Peridiniella catenata* dominated in cell numbers. The ciliate *Mesodinium rubrum* was common. Among the small cells Cryptomonadales and *Heterocapsa rotundata* were common. A few filaments of the cyanobacterium *Aphanizomenon flosaquae* were present. The integrated (0-10 m) chlorophyll concentration was far above normal for the month whereas the deeper integrated concentration (0-20 m) was in the higher region of what is normal for the month.

BY38 17th of April

Phytoplankton diversity was moderate and total abundance was relatively high. The dinoflagellate *Peridiniella catenata* was found in high cell numbers. Among the small cells Cryptomonadales and *Heterocapsa rotundata* were common. The genus *Dinobryon* was present. Both the integrated chlorophyll concentrations, 0-10 and 10-20 m, were within normal for this month.

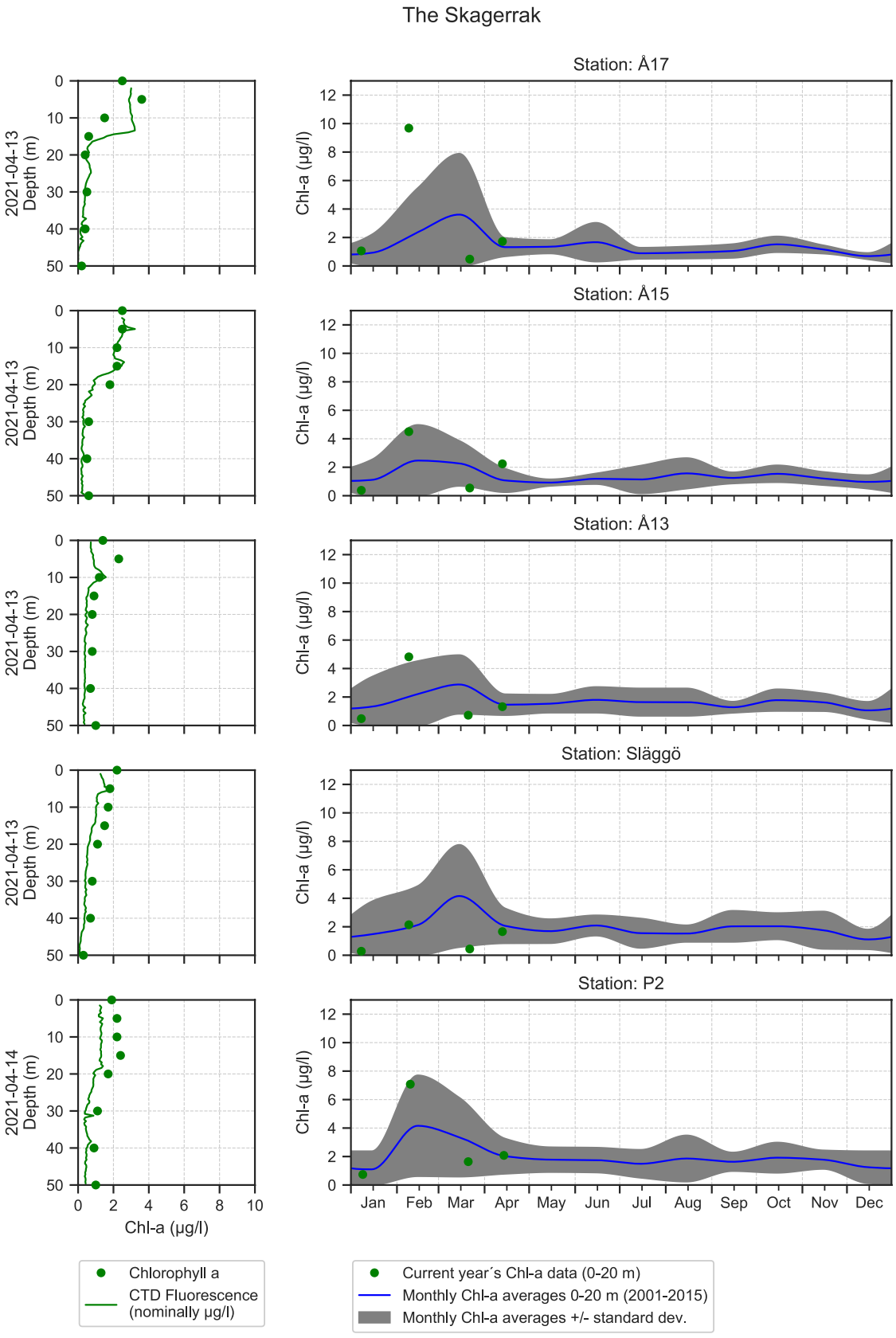
REFM1V1 18th of April

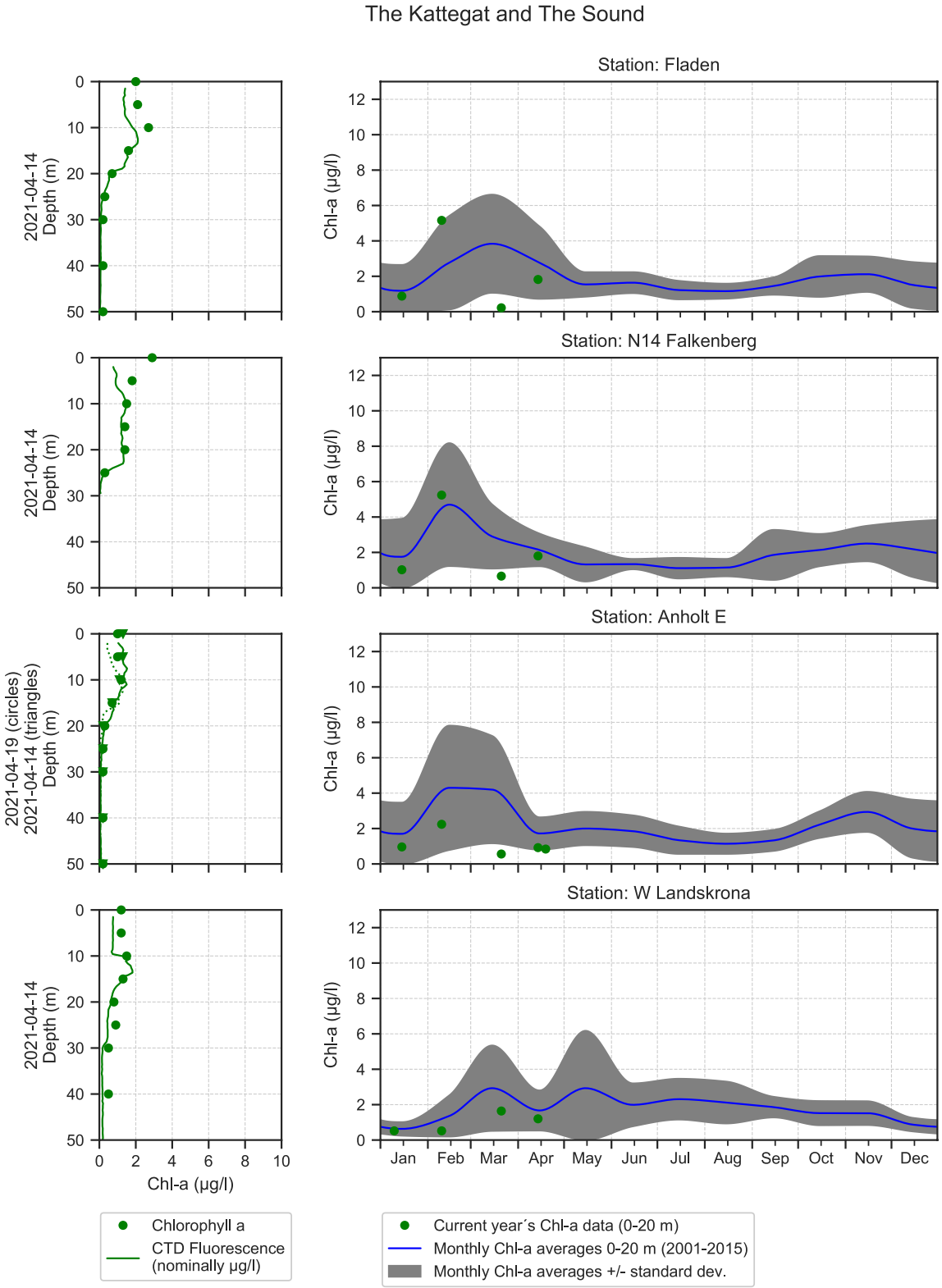
The phytoplankton diversity was quite low whereas the total abundance was moderate. The diatom *Skeletonema marinoi* was found in highest cell numbers among the large cells. Various small cryptomonadales were numerous. The dinoflagellate *Heterocapsa rotundata* was common. Both the integrated chlorophyll concentrations, 0-10 and 10-20 m, were within normal for this month.

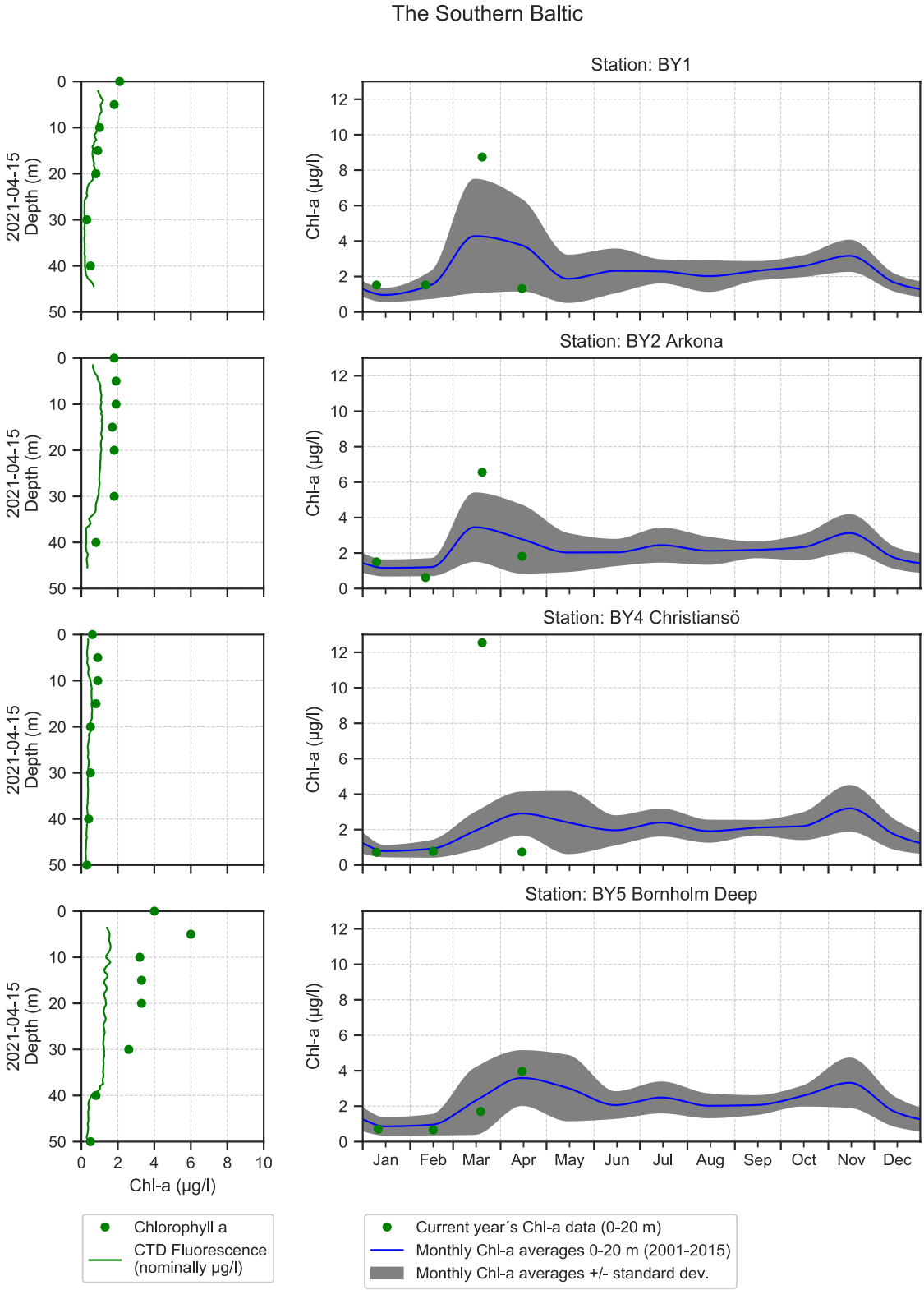
Phytoplankton analysis and text:
Marie Johansen and Maria Karlberg.

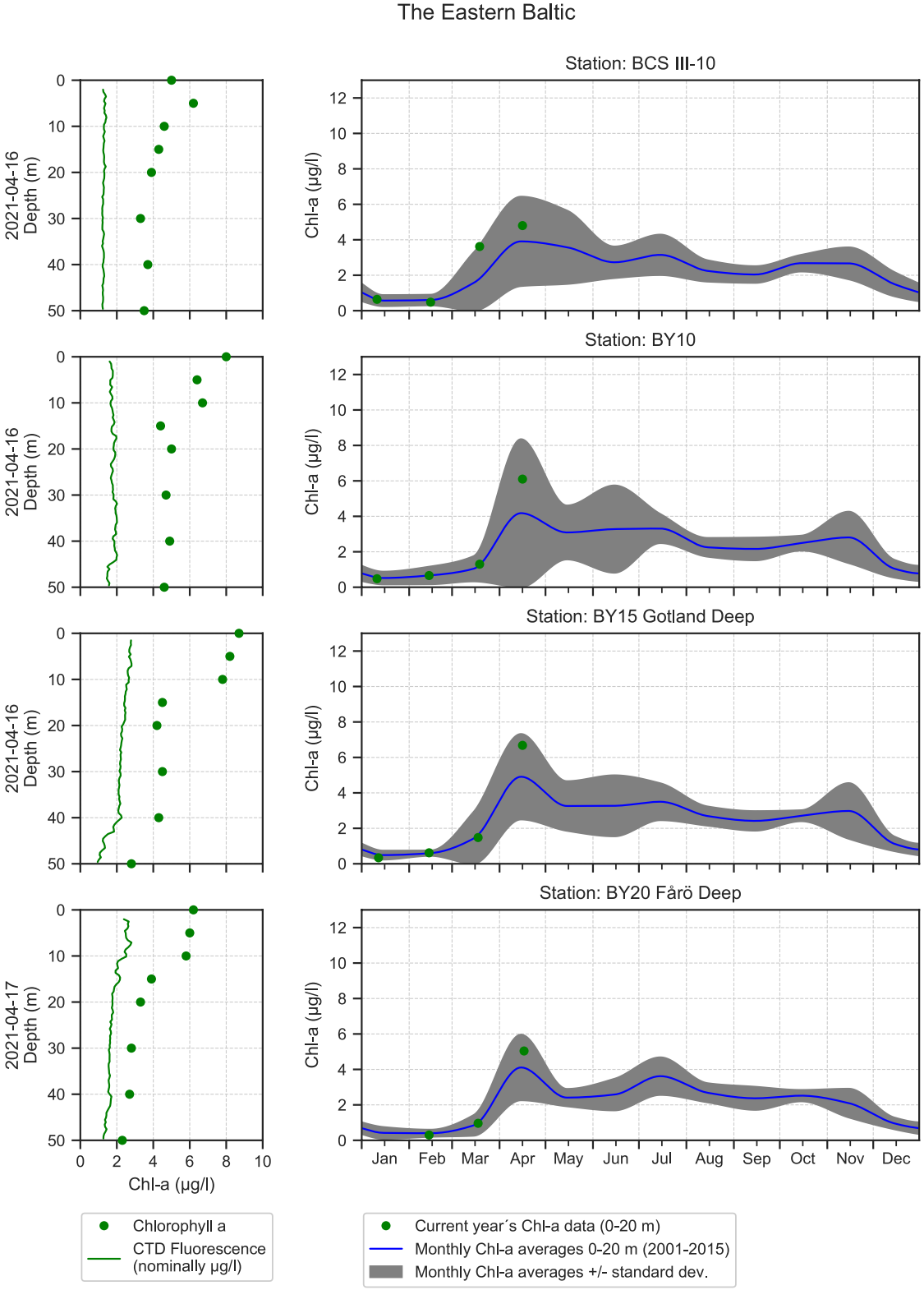
Selection of observed species	Anholt E	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	14/4	19/4	14/4	13/4	13/4
Hose 0-10 m	presence	presence	presence	presence	presence
Centrales				present	
Chaetoceros debilis				present	
Coscinodiscus radiatus	present				
Cylindrotheca closterium				common	present
Guinardia delicatula			present		
Licmophora				present	
Proboscia alata	present		present		
Pseudo-nitzschia				present	present
Rhizosolenia setigera			present		
Skeletonema marinoi	present	present	common	very common	
Thalassionema nitzschioides			present	present	
Thalassiosira				present	
Alexandrium				present	
Amphidinium crassum	present				
Dinophysis acuminata		present	present	present	
Dinophysis norvegica	present	present	present	present	
Gymnodiniales	common	common	common	common	common
Gymnodinium verruculosum	present	present			present
Gyrodinium		present			
Gyrodinium flagellare			present		
Gyrodinium spirale			present	present	
Heterocapsa rotundata	very common	very common	very common	very common	common
cf. Karlodinium veneficum	present	present	present	present	present
Katodinium glaucum	present				
Peridiniales			present	present	
Peridiniella danica	common	present	common	common	present
Protoceratium reticulatum			present		
Protoperidinium		present			
Protoperidinium bipes		present			
Protoperidinium depressum		present	present		
Torodinium robustum				present	
Tripos lineatus				present	
Tripos longipes			present		present
Tripos muelleri	present	present		present	present
Dinobryon	present	present			
Ollicola vangoorii	present		present		
Emiliania huxleyi				present	
Pyramimonas	common	common	common	common	very common
Cryptomonadales	very common	very common	very common	very common	very common
Leucocryptos marina	common	present	common	common	present
Telonema	present		present	present	common
Octactis speculum				present	
Pseudopedinella	very common	common	very common	very common	common
Choanoflagellatea			present		
Ciliophora	present	common	present	very common	present
Mesodinium rubrum				present	
Laboea strobila		present	present	common	
Tintinnopsis beroidea				present	
Eutreptiella				common	present
Flagellates	common	very common	very common	common	very common
Unicell	common	common	common	common	common

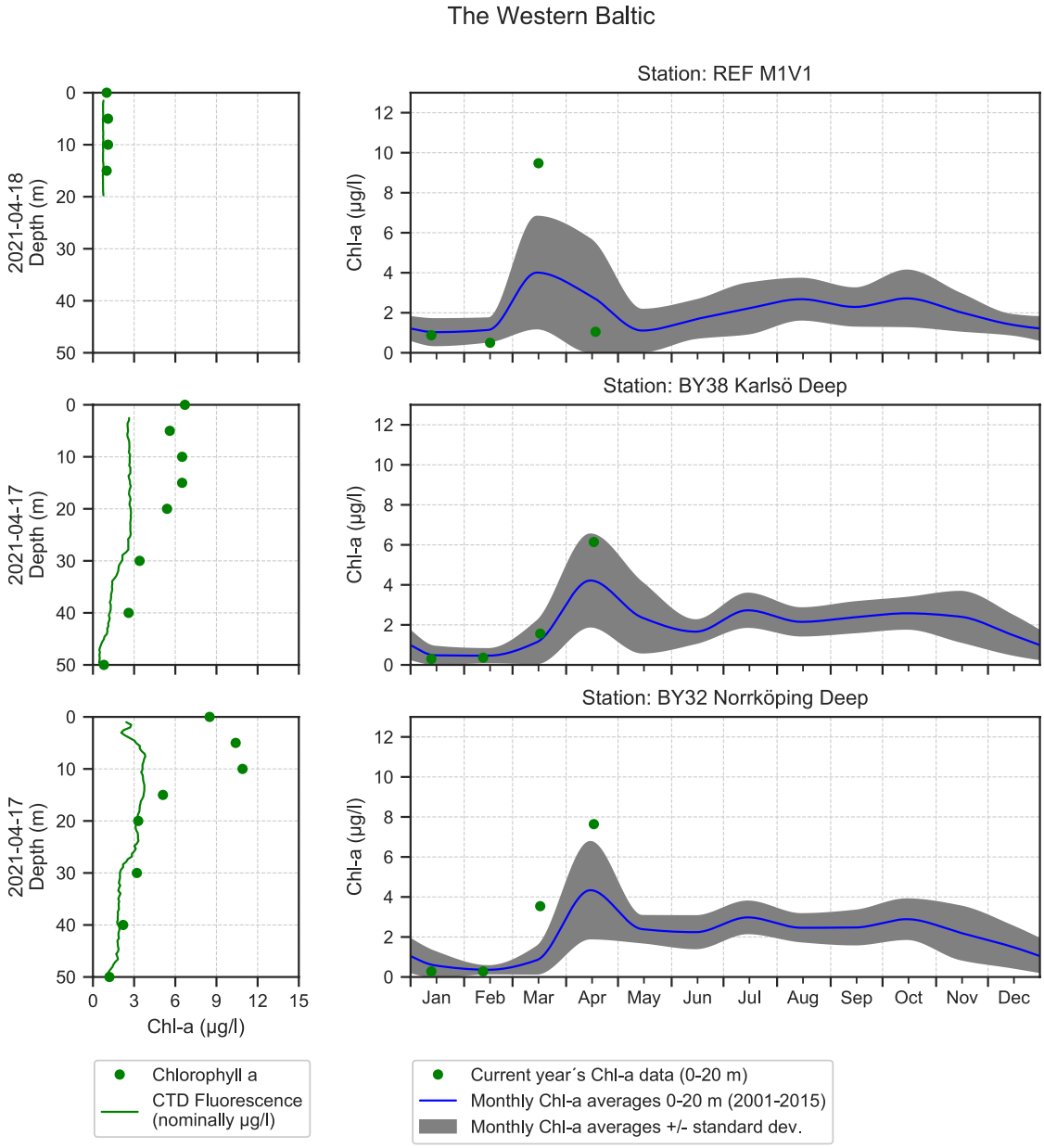
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38	REFM1V1
Red=potentially toxic species	16/4	15/4	15/4	16/4	17/4	18/4
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Centrales	present					
Chaetoceros similis		present	present			
Chaetoceros subtilis						present
Pleurosigma						present
Skeletonema marinoi		present	present			very common
Thalassiosira	present			present	present	
Thalassiosira baltica			present		present	
Amphidinium	present		present			
Amylax triacantha			present			
Dinophysis acuminata		present	present	present	present	
Gymnodiniales	common	common	common	common	common	common
Gyrodinium spirale	present					
Heterocapsa cf. arctica		present				
Heterocapsa rotundata	present	common	present	present	common	common
Katodinium glaucum		present	present		present	
Peridiniales			common	present	present	present
Peridiniella catenata	very common	present	very common	very common	very common	present
Phalacroma rotundatum				present		
Protoperidinium	present					
Dinobryon	common	common	common	present	present	present
Dinobryon balticum		common	present		present	
Prymnesiales		present	present			
Binuclearia lauterbornii	present	present		present		
Pyramimonas		common	present			
Cryptomonadales	common	common	common	common	present	common
Pseudopedinella pyriformis			present		present	
Eutreptiella		present				
Aphanizomenon flosaquae			present	present		
Aphanocapsa	present					present
Snowella	present		present	present		
Ciliophora	present	present	common	present	present	common
Mesodinium rubrum	common	common	common	common	present	common


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2021-04-13
2021-04-14
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
2021-04-14
Depth (m)
2021-04-19 (circles)
2021-04-14 (triangles)
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
2021-04-15
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
2021-04-16
2021-04-17
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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