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SMHI
Oceanographic Unit
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AlgAware
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

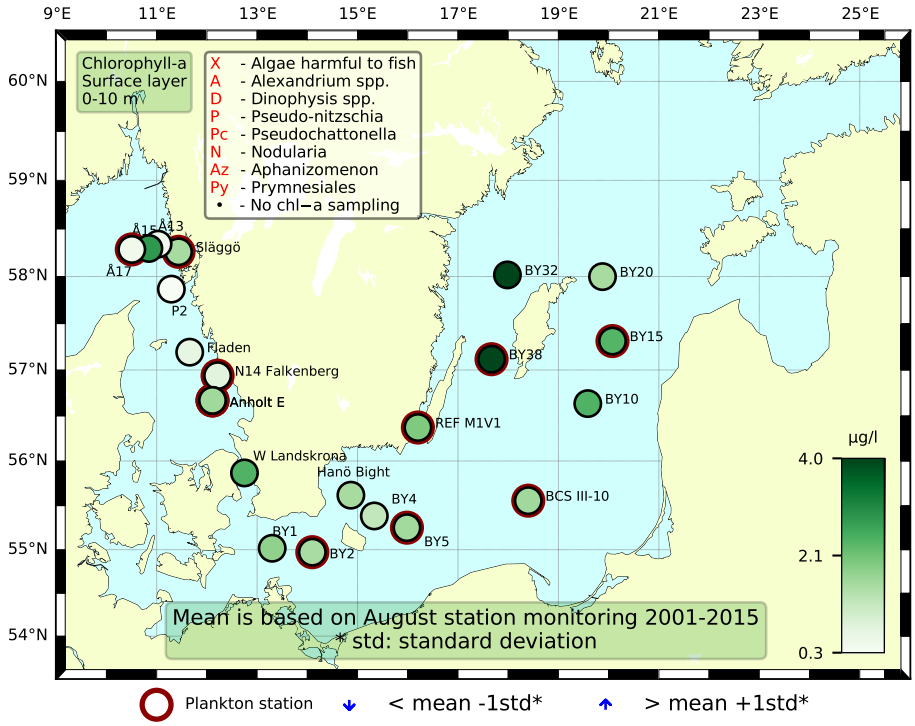
Sammanfattning

Diversiteten av växtplankton var högre i Kattegatt än i Skagerrak. I Kattegatt fanns tydlig påverkan av Östersjöns blomningar, genom att det fanns ytansamlingar av cyanobakterier som drivit ut genom Öresund. Det fanns relativt höga cellantal av kalkflagellaten *Emiliania huxleyi* i Västerhavsproverna.

De integrerade klorofyllhalterna (0-20 m) var inom det normala i Västerhavet, förutom vid Å15 där det var något över det normala för denna månad.

I södra och östra Östersjön fanns väldigt lite eller inga filamentösa cyanobakterier i proverna, däremot fanns höga cellantal av dinoflagellaten *Prorocentrum cordatum* vid BY2. Vid BY15, BY38 och vid REFM1V1 var mängden cyanobakterier hög och ytprover från BY10 och BY32 visade på dominans av den potentiellt toxiska cyanobakterien *Nodularia spumigena**.

De integrerade klorofyllhalterna (0-20 m) var inom det normala, förutom vid BY32 och BY38 där de var något över det normala för denna månad.



Abstract

The phytoplankton diversity was higher in the Kattegat than in the Skagerrak. In the Kattegat there was an obvious impact of the Baltic blooms considering the presence of cyanobacteria surface accumulations that had drifted out through the Sound. There were relatively high cell numbers of the coccolithophorid *Emiliania huxleyi* in the Kattegat and Skagerrak samples.

The integrated (0-20 m) chlorophyll concentrations were above normal at Å15, and within normal for this month at all other stations.

In the southern and eastern Baltic, there were few or none filamentous cyanobacteria in the samples. There were, however, high cell numbers of the dinoflagellate *Prorocentrum cordatum* at BY2. At BY15, BY38 and at REFM1V1, the amounts of cyanobacteria were high, and surface samples at BY10 and BY32 did have a dominance of the potentially toxic cyanobacterium *Nodularia spumigena**.

The integrated (0-20 m) chlorophyll concentrations were above normal at BY32 and BY38, just below normal at BY2 and within normal for this month at all of the other Baltic stations.

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

The Skagerrak

Å17 (open Skagerrak) 16th of August

The phytoplankton diversity was low, diatom species dominated the sample with twice as many taxa as the dinoflagellates. The coccolithophorid *Emiliania huxleyi* was present in low amounts.

Släggö (Skagerrak coast) 16th of August

The species diversity was high although the individual species cell numbers were low. The most numerous species were the diatoms *Pseudo.nitzschia* spp.* and *Skeletonema marinoi*, the heterotrophic dinoflagellate *Polykrikos schwartzii* and the coccolithophorid *E. huxleyi*. The dinoflagellates were the most species rich group.

A fluorescence peak at Å15 was caused by a diverse set of phytoplankton where diatoms dominated and dinoflagellate species were abundant as well.

The integrated (0-20 m) chlorophyll concentrations were just above normal at Å15, and within normal for this month at all of the other Skagerrak stations.

The heterotrophic dinoflagellate *Polykrikos schwartzi* (left) and the potentially toxic diatom *Pseudo-nitzschia* spp. were abundant at Släggö.

The Kattegat

Anholt E 17th and 21st of August

The phytoplankton diversity was higher than at the Skagerrak stations, especially at the second visit. Also at the second visit, there was a bigger impact from the Baltic considering cyanobacteria. *Dolichospermum* sp. was present at both occasions, but was more abundant at the 21st of August when there also were moderate amounts of *Nodularia spumigena**. Surface accumulations of cyanobacteria had in fact been transported out to the Kattegat and Skagerrak areas with the Baltic current and were reported as far north as Orust/Tjörn.

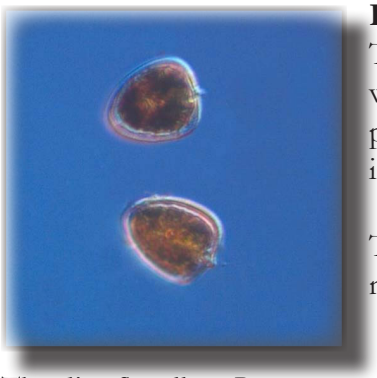
N14 Falkenberg 17th of August

The coccolihtophorid *Emiliania huxleyi* was the most numerous species and the potentially toxic cyanobacterium *Nodularia spumigena** was present in low amounts. The diatoms *Pseudo-nitzschia* spp., *Proboscia alata* and *Cylindrotheca closterium* were found in moderate cell numbers. The species diversity was rather low with approximately equivalent numbers of diatom and dinoflagellate species.

Due to visible surface accumulations of cyanobacteria, sampling was performed from the surface water. Moderate amounts of *Nodularia spumigena** were found of which approximately fifty percent were fresh, living specimens and the other 50 % were bleached filaments, ergo dead. *Dolichospermum* sp. was found in low amounts.

A fluorescence peak at 10 m at W Landskrona was caused by the diatom *Dactyliosolen fragilissimus* as well as many other species in a diverse sample of diatoms, dinoflagellates and other phytoplankton groups.

The integrated (0-20 m) chlorophyll concentrations were normal for this month at all of the Kattegat stations.



The dinoflagellate *Prorocentrum cordatum* was abundant at BY2.

BY2 Arkona basin 18th of August

The small dinoflagellate *Prorocentrum cordatum* was found in high cell numbers and was the most numerous species with the diatom *Dactyliosolen fragilissimus* in second place. The cyanobacteria *Aphanizomenon flosaquae* and *Dolichospermum* sp. were present in very low amounts.

The integrated (0-20 m) chlorophyll concentration was just below normal for this month.

BY5 Bornholm basin 18th of August

The low phytoplankton diversity was dominated by ciliates. The cyanobacterium *N. spumigena** and diatom *Chaetoceros castracanei* were present in low amounts.

BCSIII-10 19th of August

The phytoplankton situation was very similar to the one at BY5 except that no filamentous cyanobacteria were present.

BY15 19th of August

Some filaments of *N. spumigena** were observed, but *A. flosaquae* was the most abundant cyanobacterium. Small colonyforming cyanobacteria were abundant.

BY38 20th of August

All of the three most common filamentous summer cyanobacteria were present, of which *Aphanizomenon flosaquae* was the most abundant. *Nodularia spumigena** and *Dolichospermum* sp. were found in moderate amounts. Small colonyforming cyanobacteria were abundant. The phytoplankton diversity was clearly higher than at the other Baltic stations with more than twice as many taxa present.

REFM1V1 20th of August

The amounts of *N. spumigena** and *Dolichospermum* sp. were lower than at BY38 and *A. flosaquae* was the most abundant cyanobacterium. The small diatom *Cylindrotheca closterium* was found in high cell numbers.

Fluorescence peaks

BY10 19th of August and BY32 20th of August, surface samples

These were diverse samples with dense clusters of the filamentous cyanobacteria. *N. spumigena** dominated and numerous other species were present that have used the surface accumulations as a substrate to live in and around. Ciliates and pennate diatoms were abundant.

BY20, 15 m

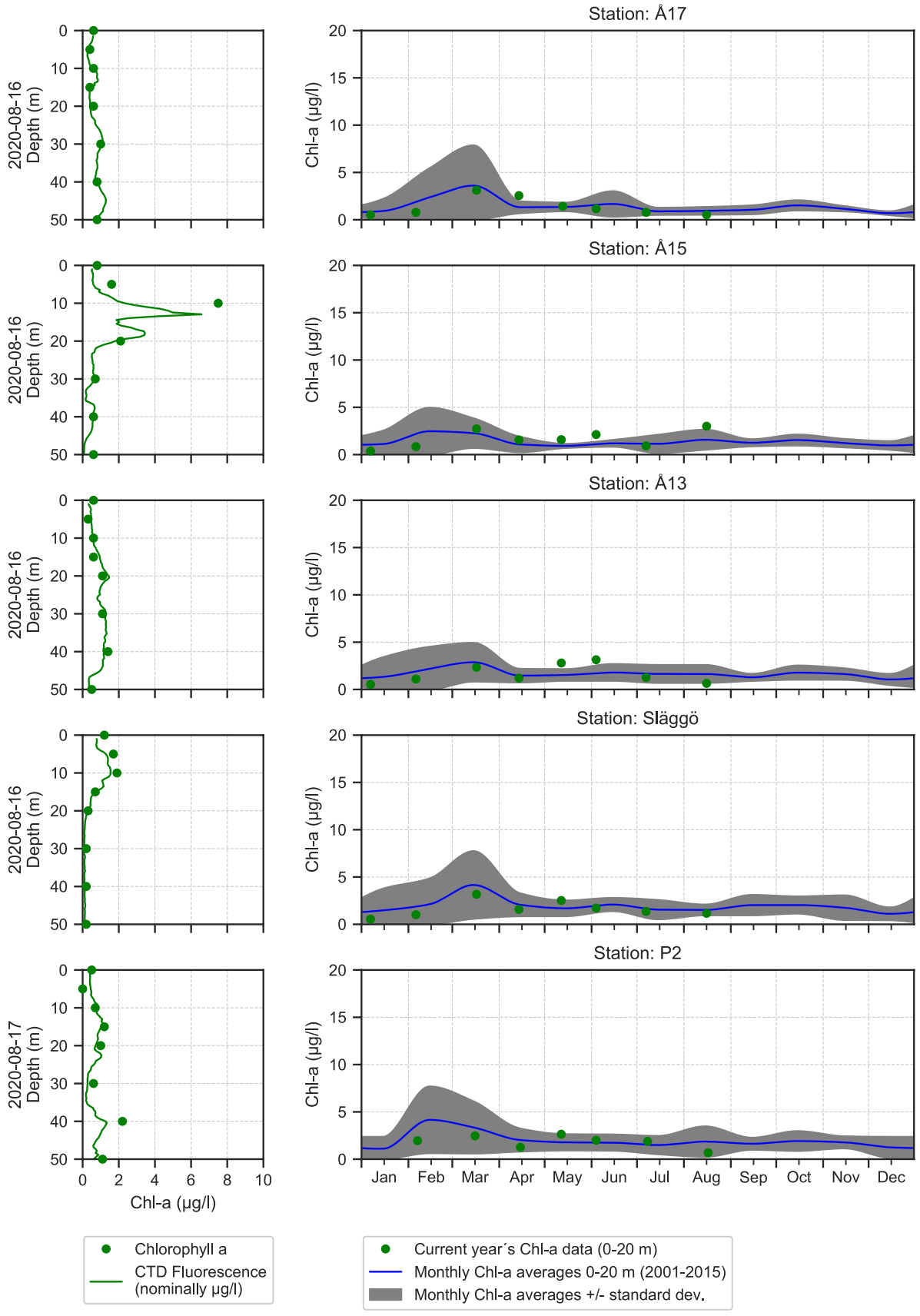
Small colonyforming cyanobacteria, cryptomonadales and other small flagellated species caused the fluorescence peak.

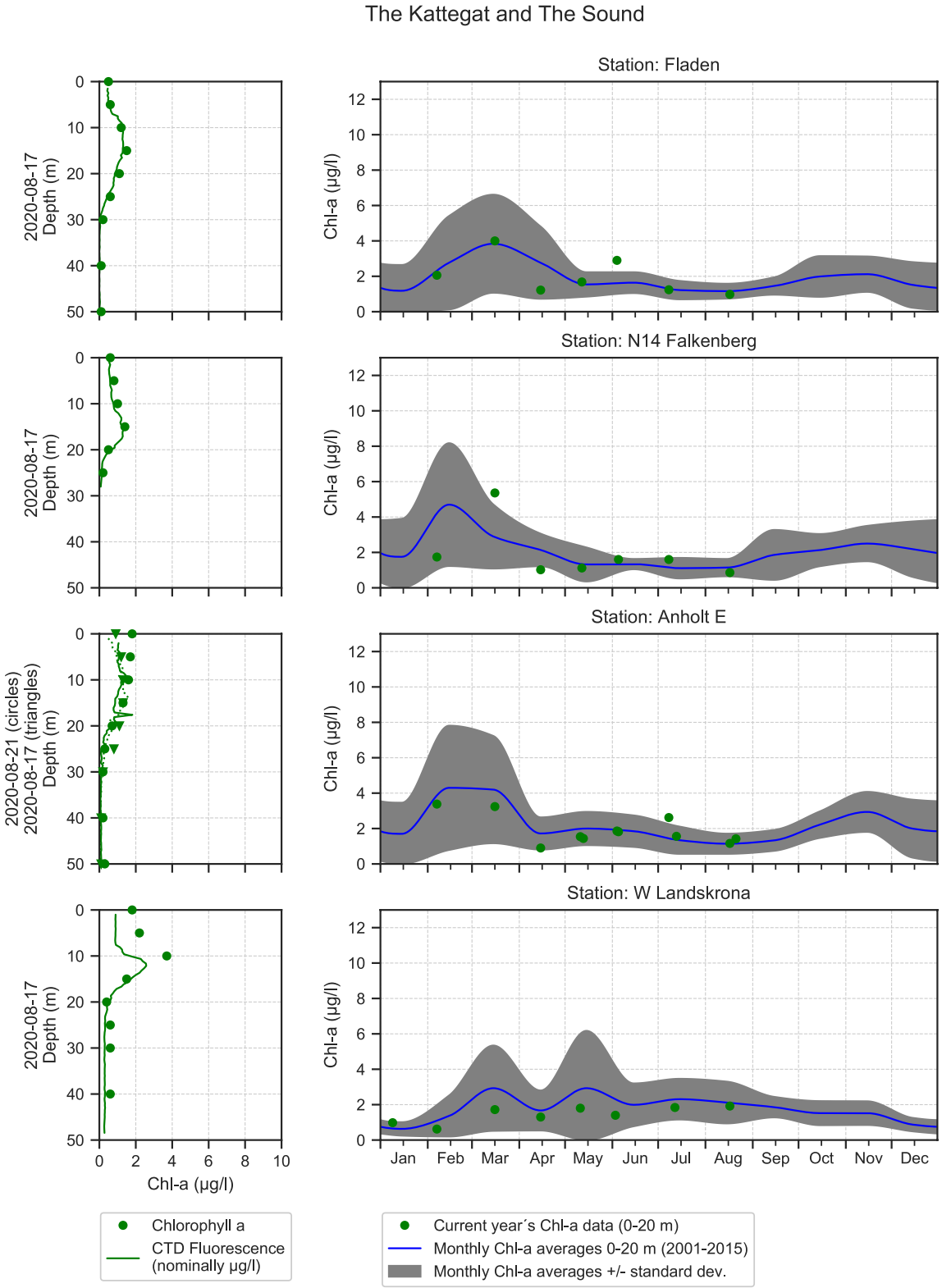
The integrated (0-20 m) chlorophyll concentrations were above normal at BY32 and BY38, just below normal at BY2 and within normal for this month at all of the other Baltic stations.

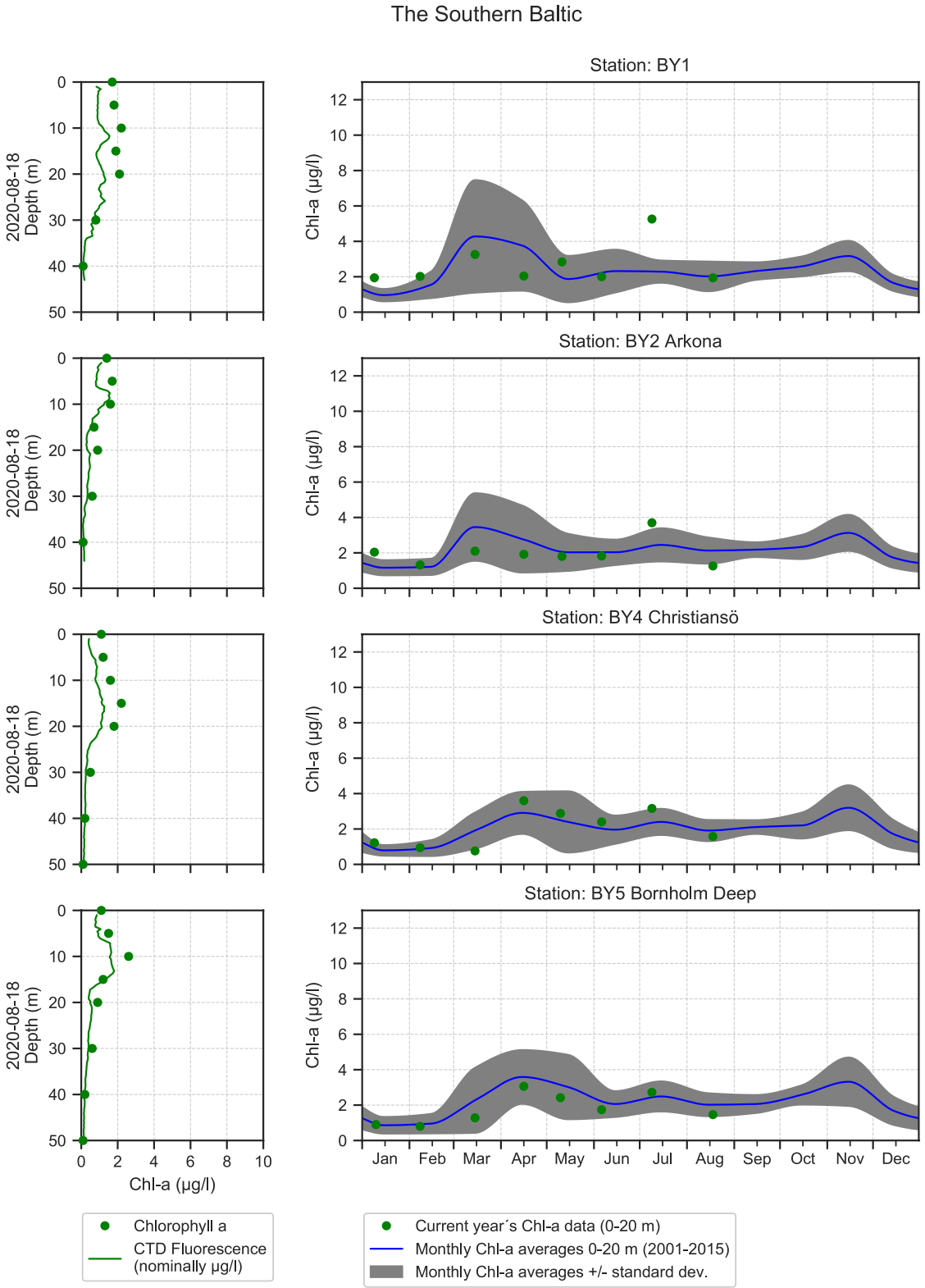
Phytoplankton analysis and text: Ann-Turi Skjevik

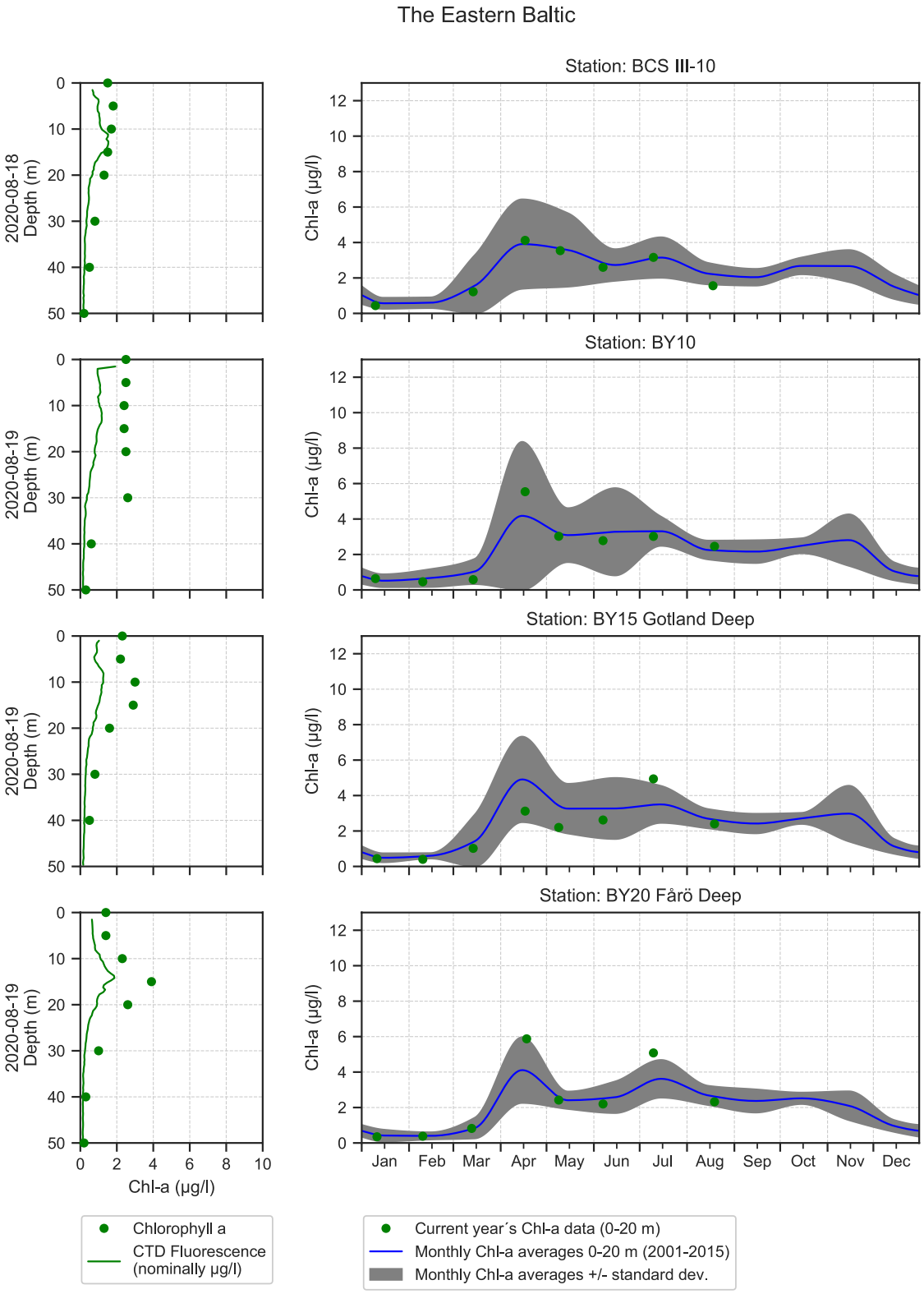
Selection of observed species	Anholt E	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	17/8	21/8	17/8	16/8	16/8
Hose 0-10 m	presence	presence	presence	presence	presence
Cerataulina pelagica	present		present		present
Chaetoceros		present			
Chaetoceros affinis				present	
Chaetoceros contortus					present
Chaetoceros convolutus		present			
Chaetoceros curvisetus	present	present			present
Chaetoceros lorenzianus					present
Chaetoceros socialis		present			present
Chaetoceros throndsenii		present		present	
Cylindrotheca closterium	present	common	common	present	present
Dactyliosolen fragilissimus	present	common	present	present	present
Guinardia flaccida	present			present	present
Leptocylindrus danicus	present	present		present	present
Leptocylindrus minimus		present	present		
Nitzschia longissima	present	present	present	present	present
Proboscia alata	present	present	common	present	present
Pseudo-nitzschia	common	very common	common	common	present
Pseudosolenia calcar-avis		present	present		
Rhizosolenia imbricata	present				
Rhizosolenia pungens	present	present			present
Skeletonema marinoi	present	present	present	common	present
Thalassionema nitzschioides	present	present			
Thalassiosira angulata	present				
Alexandrium pseudogonyaulax		present			
Amphidinium crassum	present	present	present		
Dinophysis acuminata				present	
Dinophysis acuta				present	
Dinophysis norvegica	present			present	
Gonyaulax		present			
Gymnodinium verruculosum		present			
Gyrodinium flagellare		present			
Heterocapsa				present	
Heterocapsa rotundata		present	present		present
Heterocapsa triquetra				present	
Karenia mikimotoi					present
Karlodinium veneficum		present	present	present	
Katodinium glaucum	present	present	present	present	
Lessardia elongata				present	
Polykrikos schwartzii			present	common	
Prorocentrum balticum	present				
Prorocentrum micans	present	present	present	present	present
Protoperidinium				present	
Protoperidinium bipes				present	
Protoperidinium oblongum		present			
Scrippsiella				present	
Torodinium robustum				present	
Tripos furca					present
Tripos fusus	present	present	present		
Tripos lineatus				present	present
Tripos macroceros	present				present
Tripos muelleri	present	present	present	present	present
Acanthoica quattrospina				present	present
Emiliania huxleyi	common	common	very common	common	present
Prymnesiales		present			present
Cryptomonadales	common	common	common	present	present
Dinobryon			present		
Dinobryon faculiferum		present		present	
Dolichospermum	present	common		present	
Nodularia spumigena		present	present	present	
Pseudanabaena		present	present	present	
Binuclearia lauterbornii		present			
Pterosperma			present		
Pyramimonas		present		present	present
Eutintinnus		present			
Laboea strobila	present	common	present	present	present
Tiarina fusus	present		present		
Ciliophora	present	present	present	present	present

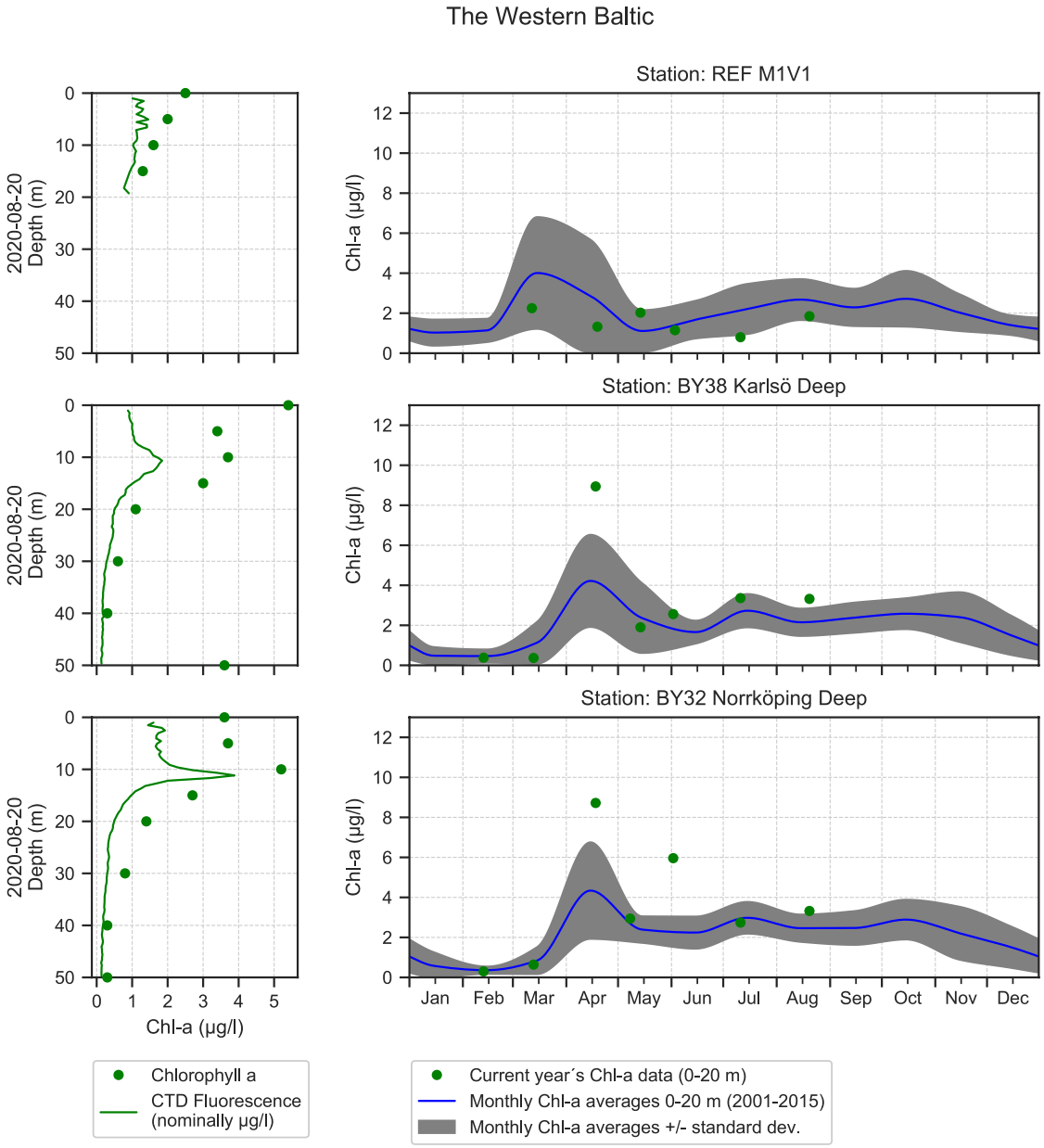
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38	REFM1V1
Red=potentially toxic species	19/8	18/8	18/8	19/8	20/8	20/8
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Attheya septentrionalis			present			
Centrales	present			present		
Chaetoceros castracanei	present		present	present	present	present
Chaetoceros danicus	present	present		present	present	present
Cylindrotheca closterium		present			present	common
Dactyliosolen fragilissimus		common				
Leptocylindrus minimus			present			
Pennales					common	
Skeletonema marinoi		present				
Amphidinium crassum				present	present	
Dinophysis acuminata		present			present	present
Gymnodiniales	present			present	present	present
Gymnodinium verruculosum	present		present			present
Heterocapsa	present		present			
Heterocapsa rotundata			present		present	present
Heterocapsa triquetra					present	present
Karlodinium veneficum		present			present	
Peridiniales				present	present	
Phalacroma rotundatum				present	present	
Prorocentrum cordatum	present	very common				
Scrippsiella					present	
Aphanizomenon flosaquae		present		common	common	common
Dolichospermum		present			present	present
Nodularia spumigena			present	present	present	present
Aphanothece				common	common	present
Aphanothece paralleliformis					present	present
Snowella				present	present	present
Binuclearia lauterbornii				present	present	
Cryptomonadales	common	present	present	common	common	common
Eutreptiella				present	present	present
Pterosperma	present		present	present	present	present
Pyramimonas	present	present	present	present	present	present
Oocystis				present		
Ebria tripartita	present	present	present	present		present
Coxliella helix					present	
Helicostomella subulata		present	present			
Mesodinium rubrum	present			present		
Ciliophora	common	present	common	present	present	present


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2020-08-16
2020-08-17
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.


The Kattegat and The Sound
Station: Fladen
Station: N14 Falkenberg
Station: Anholt E
Station: W Landskrona
2020-08-17
Depth (m)
2020-08-21 (circles)
2020-08-17 (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
2020-08-18
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.


The Eastern Baltic
Station: BCS III-10
Station: BY10
Station: BY15 Gotland Deep
Station: BY20 Fårö Deep
2020-08-18
2020-08-19
2020-08-19
2020-08-19
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.



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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