SMHI
Oceanographic Unit
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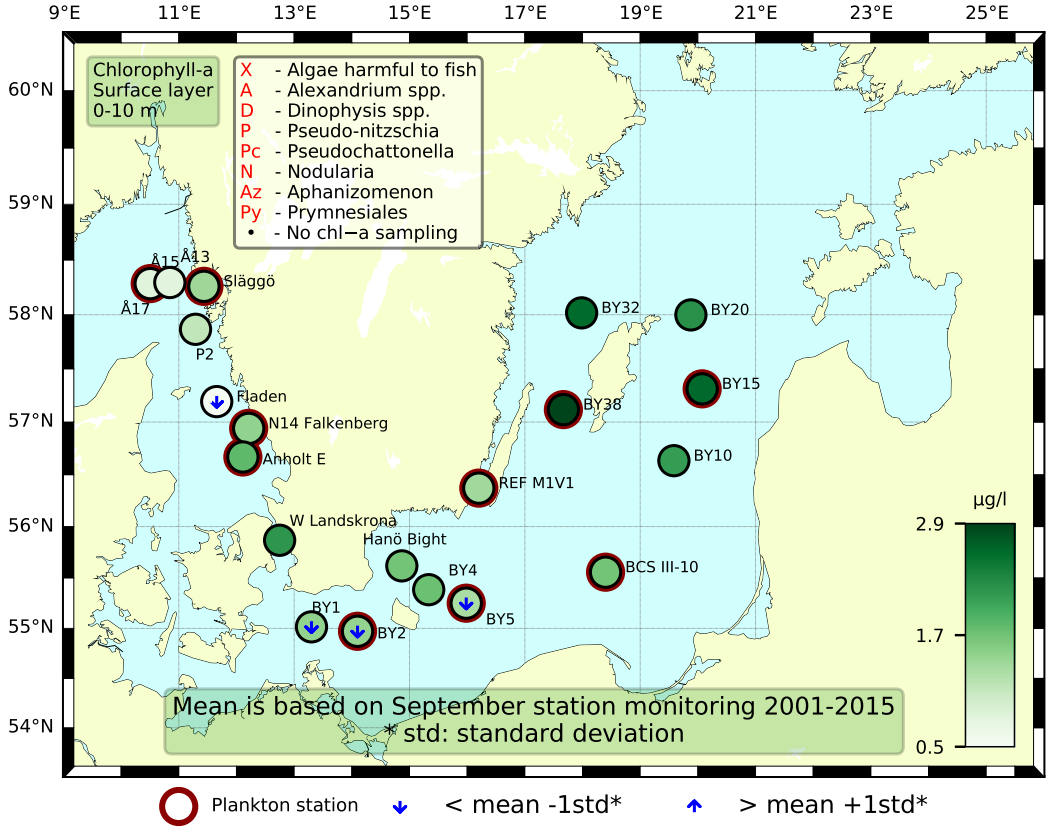
AlgAware
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Dnr: S/Gbg-2021-137

Sammanfattning

Artdiversiteten och cellantalen var låga på Å17, men höga på de tre andra stationerna. Å17 hade mest små arter av dinoflagellater, som *Gymnodiniales*, *Heterocapsa rotundata* och *Karenia mikimotoi**. De andra stationerna hade både kiselalger och dinoflagellater i varierande storlekar, samt en hel del toxinbildande arter. *Pseudosolenia calcar-avis* var den art som hade högt cellantal på Släggö, Anholt E och N14 Falkenberg. De integrerade klorofyllvärdena var normala för årstiden vid samtliga stationer.

Artdiversiteten och totala cellantal var generellt låga i Östersjön. Den filamentösa cyanobakterien *Aphanizomenon flosaquae* fanns i låga antal vid samtliga stationer. Vanligt förekommande vid flertalet stationer var olika celler från gruppen Cryptomonadales och olika ciliater. Vid de södra stationerna var även nakna dinoflagellater vanliga. De integrerade klorofyllvärdena var inom det normala för denna månaden där enda undantaget var i södra Östersjön där värdena var lägre än normalt.



Abstract

Species diversity and cell numbers were low at Å17, but high at the other three stations. Å17 had mostly small species of dinoflagellates, such as *Gymnodiniales*, *Heterocapsa rotundata* and *Karenia mikimotoi**. The other stations had both diatoms and dinoflagellates in various sizes, as well as some toxin producing species. *Pseudosolenia calcar-avis* was the species with high cell numbers at Släggö, Anholt E and N14 Falkenberg. The integrated chlorophyll concentrations were normal at all stations for this month.

The species diversity and total cell numbers were overall low in the Baltic Proper. The filamentous cyanobacterium *Aphanizomenon flosaquae* was found in low amounts at all stations. Most commonly found at most stations were different cells of the Cryptomonadales group and various ciliates. At the southern stations so called naked dinoflagellates were common. The integrated chlorophyll concentrations were within normal for this month, the only exception being the southern stations where the concentrations were below normal.

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 September

Both phytoplankton diversity and total cell numbers were low. Various species of *Gymnodiniales* were numerous, and also the dinoflagellates *Heterocapsa rotundata* and *Karenia mikimotoi**. There were also some small cells such as Cryptomonadales, unidentified flagellates, *Pseudopedinella* sp. and a few cells of *Pseudo-nitzschia* sp.* The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were within normal for this month.

Släggö (Skagerrak coast) 16th of September

Both phytoplankton diversity and cell numbers were relatively high. The most numerous species were *Pseudo-nitzschia* sp.*, *Pseudosolenia calcar-avis* and *Gymnodiniales*. Among the toxic species, *Heterosigma akashiwo** was found in quite high cell numbers, while *Dinophysis acuminata**, *Karenia mikimotoi**, *Lingulodinium polyedra** and *Phalacroma rotundatum** were present. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were within normal for this month.

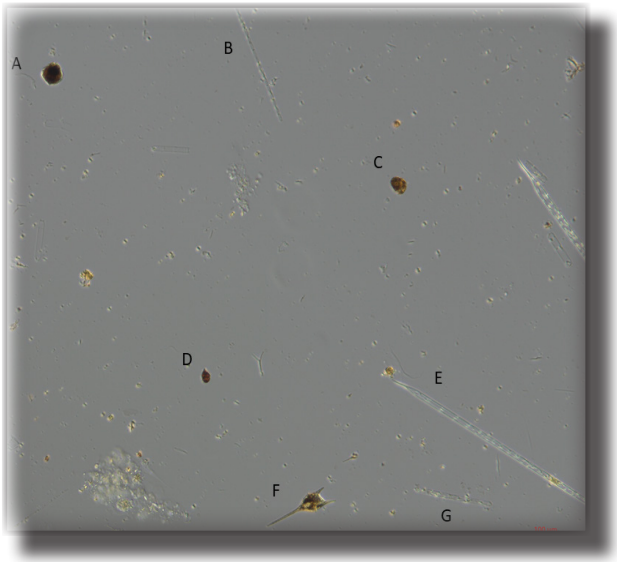


*Figure 1.*A representation of one of the three stations with high diversity. A. *Lingulodinium polyedra**, B. *Leptocylindrus minimus*, C. Gymnodiniales, D. *Scrippsiella* CPX, E. *Pseudosolenia calcar-avis*, F. *Tripos lineatus* and G. *Cerataulina pelagica*. Photo: Maria Karlberg.

The Kattegat

Anholt E 17th of September

Both phytoplankton diversity and cell numbers were relatively high, with cells ranging from small flagellates to large dinoflagellates and diatoms. The most numerous species was *Pseudosolenia calcar-avis*. Other species with quite high cell numbers were, among the diatoms, *Cerataulina pelagica*, *Chaetoceros minimus*, *Dactyliosolen fragilissimus*, *Leptocylindrus minimus*, *Pseudo-nitzschia* sp.*, *Skeletonema marinoi*, and among the dinoflagellates *Alexandrium pseudogonyaulax**, *Gymnodiniales*, *Heterocapsa rotundata* and *Tripos lineatus*, as well as various small cells. There were some other toxic species present: *Dinophysis acuminata**, *Lingulodinium polyedra**, *Phalacroma rotundatum**, *Heterosigma akashiwo** and one coil of *Nodularia spumigena**. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were within normal for this month.

N14 Falkenberg 17th of September

Both phytoplankton diversity and cell numbers were relatively high, with cells ranging from small flagellates to large dinoflagellates and diatoms. The most numerous species was *P. calcar-avis*. Other species with quite high cell numbers were, among the diatoms *C. pelagica*, *Chaetoceros teniussimus*, *L. minimus*, *Nitzschia longissima*, *S. marinoi*, and among the dinoflagellates *H. rotundata*, *L. polyedra**, as well as various small cells. There were some other toxic species present: *Alexandrium* sp.*, *A. pseudogonyaulax**, *D. acuminata** and *D. norvegica**. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were within normal for this month.

The Baltic

BY2 18th of September

The total cell numbers and biodiversity were both low. The sample was dominated by various ciliates and Cryptomonadales. A few filaments of the cyanobacterium *Aphanizomenon flosaquae* was noted. The small cells were dominated by various Cryptomonadales species. Among the dinoflagellates a few cells of *Tripos muelleri* and unidentified Gymnodiniales species were found. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were below normal for this month.

BY5 18th of September

The total cell numbers and biodiversity were very low. The sample was dominated by various ciliates. Several large *Helicostomella subulata* was found but most of them were empty shells. A few filaments of the cyanobacterium *A. flosaquae* was noted. The small cells were dominated by different Cryptomonadales. A few cells of *Dinophysis norvegica** were found. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were both below normal for this month.

BCSIII-10 19th of September

The total cell numbers and biodiversity were very low. The sample was dominated by various ciliates. Several large *H. subulata* were found but most of them with empty shells. A few filaments of the cyanobacterium *A. flosaquae* were found. The small cells were dominated by various Cryptomonadales and *Pyramimonas* species. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were within normal for this month.

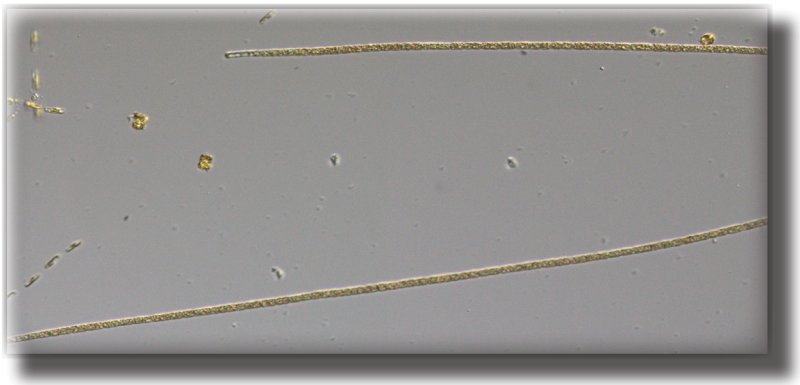


Figure 2. The cyanobacterium *Aphanizomenon flosaquae* was found at all stations in the Baltic proper. Photo: Ann-Turi Skjevik.

BY15 19th of September

The total cell numbers and biodiversity were both low. The sample had several cells of the diatom genus *Coscinodiscus*, the ciliate *Mesodinium rubrum* and some filaments of the cyanobacterium *A. flosaquae*. Among the small cells Cryptomonadales species were the most common. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were within normal for this month.

BY38 20th of September

The total cell numbers and biodiversity were both moderate. The sample had a slight domination of *A. flosaquae* and the diatom *Chaetoceros castracanei* was also found in high numbers. Among the small cells the genera *Monoraphidium*, *Pyramimonas* and Cryptomonadales were the most common. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were within normal for this month.

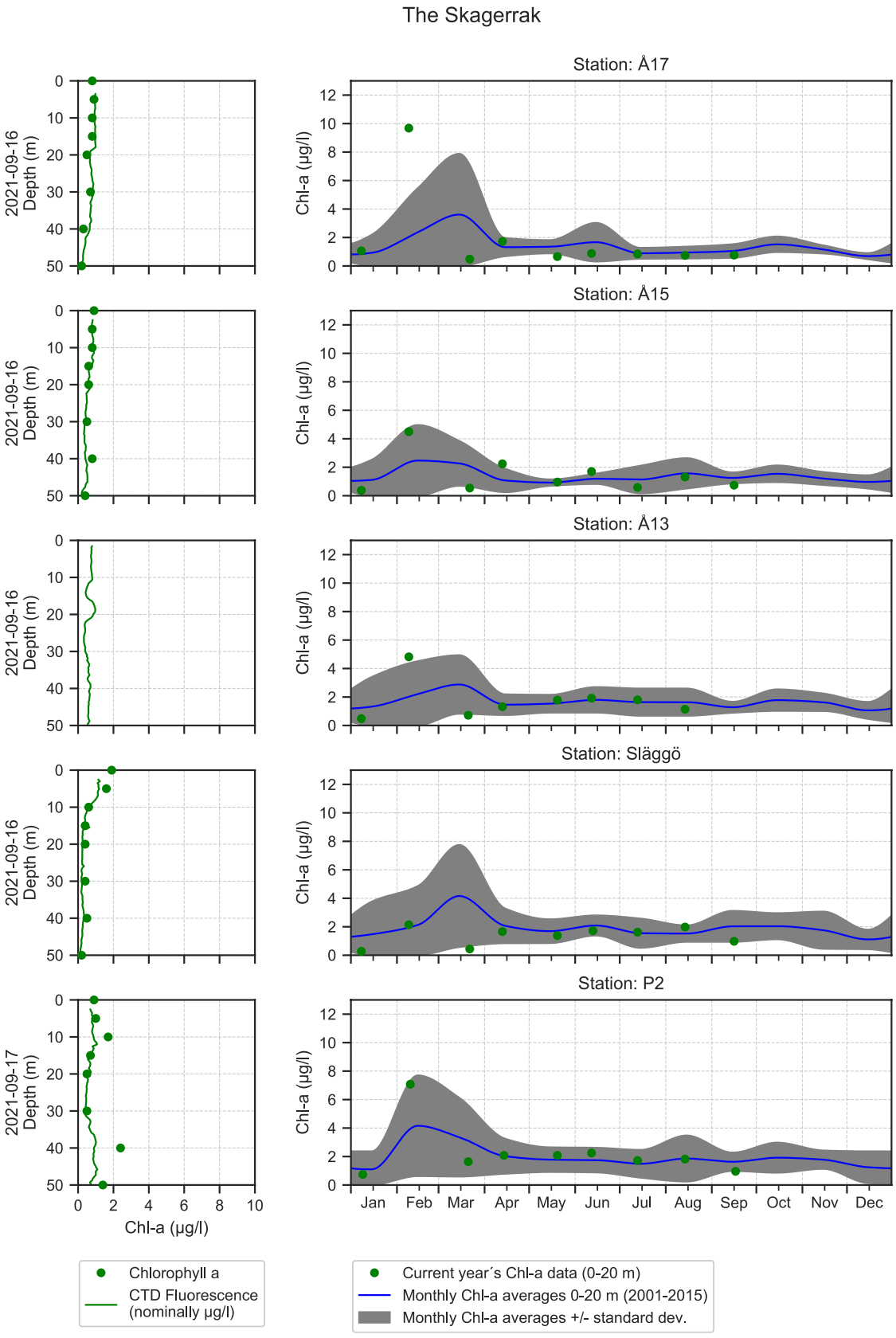
REFM1V1 21st of September

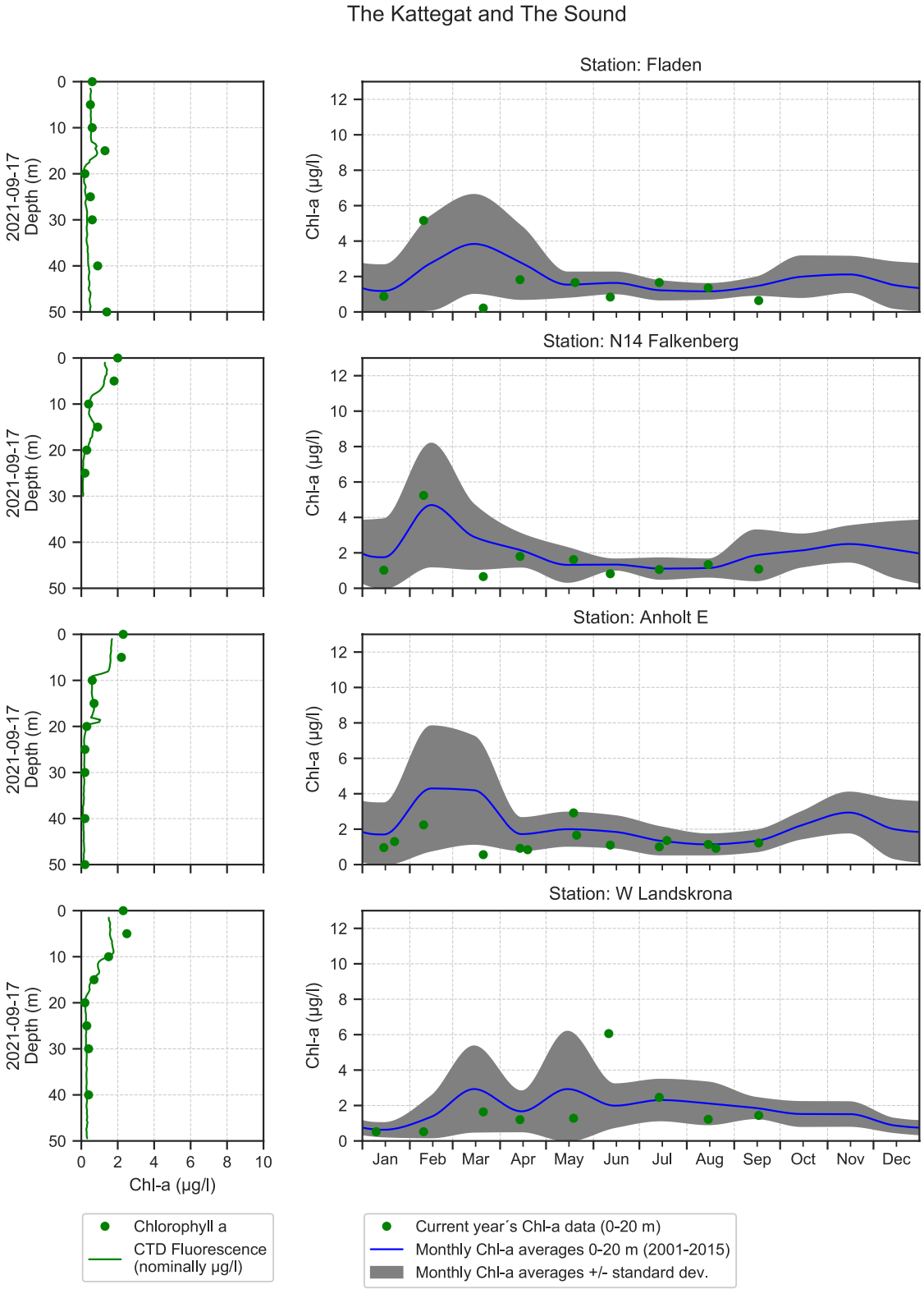
The total cell numbers and biodiversity were both moderate. The sample had quite a few filaments of *A. flosaquae* and various ciliates. Among the small cells, various Cryptomonadales were most common. Among the dinoflagellates the genus *Dinophysis** was the most common. Some chains of the diatom genus *Chaetoceros* were also found. The integrated chlorophyll concentrations, 0-10 and 10-20 meters, were below normal for this month.

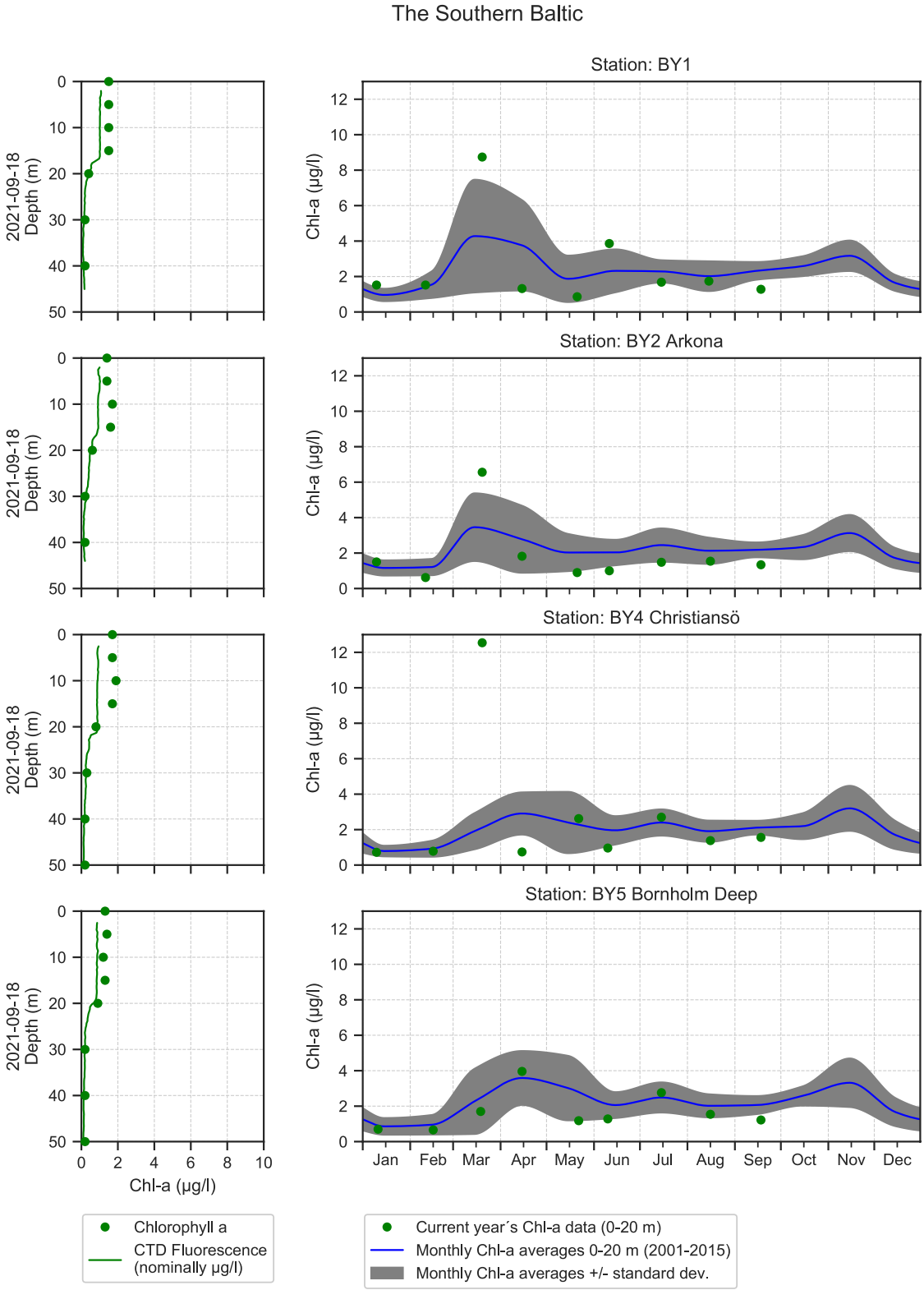
Phytoplankton analysis and text:
Marie Johansen and Maria Karlberg

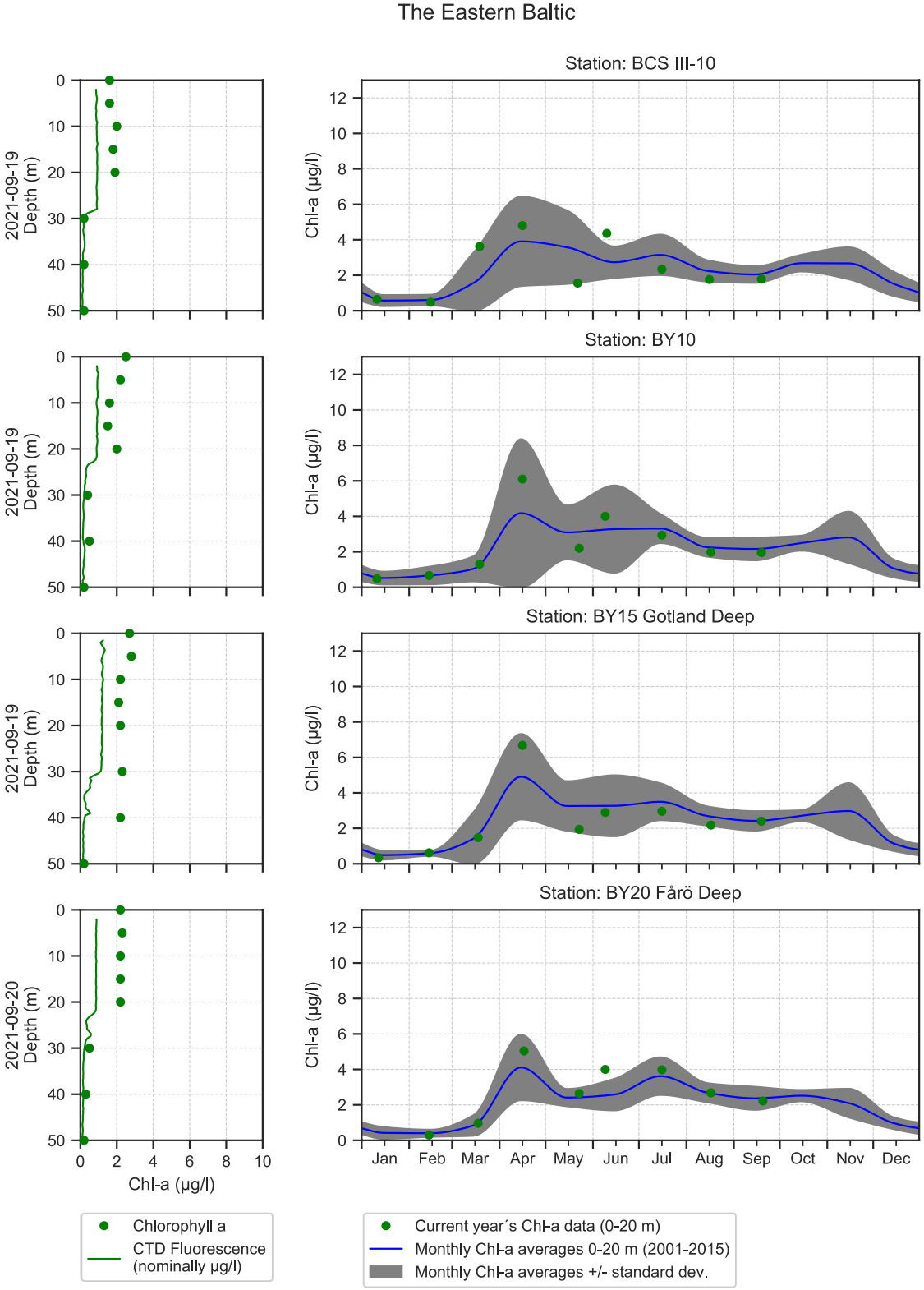
Selection of observed species	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	17/9	17/9	16/9	16/9
Hose 0-10 m	presence	presence	presence	presence
Cerataulina pelagica	common	common	present	
Chaetoceros			present	
Chaetoceros affinis	present			
Chaetoceros cf. convolutus	present	present		
Chaetoceros minimus	common	present		
Chaetoceros socialis	present			
Chaetoceros tenuissimus	present	common	present	
Dactyliosolen fragilissimus	common			
Ditylum brightwellii			present	
Lennoxia faveolata		present		present
Leptocylindrus danicus	present		present	
Leptocylindrus minimus	common	common	present	
Licmophora	present			
Nitzschia longissima	present	common	present	
Proboscia alata		present	present	
Pseudo-nitzschia	common		very common	present
Pseudosolenia calcar-avis	very common	very common	very common	
Rhizosolenia setigera f. pungens	present	present	present	
Skeletonema marinoi	common	common		
Alexandrium		present		
Alexandrium pseudogonyaulax	common	present		
Dinophysis acuminata	present	present	present	
Dinophysis norvegica		present		
Ensiculifera carinata			present	
Gymnodiniales	common		very common	very common
Gymnodinium verruculosum			present	present
Gyrodinium spirale		present		
Heterocapsa rotundata	common	common	common	common
Karenia mikimotoi			present	common
Katodinium glaucum	present	present	present	
Lessardia elongata	present	present	present	
Lingulodinium polyedra	present	common	present	
Noctiluca scintillans		present		
Oxytoxum gracile			common	present
Peridiniales	present	present		
Phalacroma rotundatum	present		present	
Polykrikos schwartzii		present	present	
Prorocentrum compressum		present	present	
Prorocentrum micans	present	present	present	
Protoperidinium divergens	present	present		
Protoperidinium granii	present			
Protoperidinium pentagonum		present		
Protoperidinium steinii	present	present		
Scrippsiella CPX	present	present	common	
Torodinium robustum		present	present	present
Tripos furca	present		present	
Tripos fusus	present	present	present	
Tripos lineatus	common	present	present	
Tripos muelleri	present	present		
Dinobryon balticum		present	present	
Dinobryon faculiferum			present	
Cryptomonadales	common	common	common	common
Acanthoica quattrospina			present	
Emiliania huxleyi	present	common	common	present
Heterosigma akashiwo	present		common	
Halosphaera viridis			present	
Pyramimonas	common	present		
Telonema	present	present		
Apedinella radians			present	
Pseudopedinella	common		common	common
Eutreptiella	present			
Nodularia spumigena	present			
Choanoflagellatea		present		present
Ciliophora	common	common	common	common
Mesodinium rubrum				present
Laboea strobila	present	present	present	
Flagellates	common	common	common	common

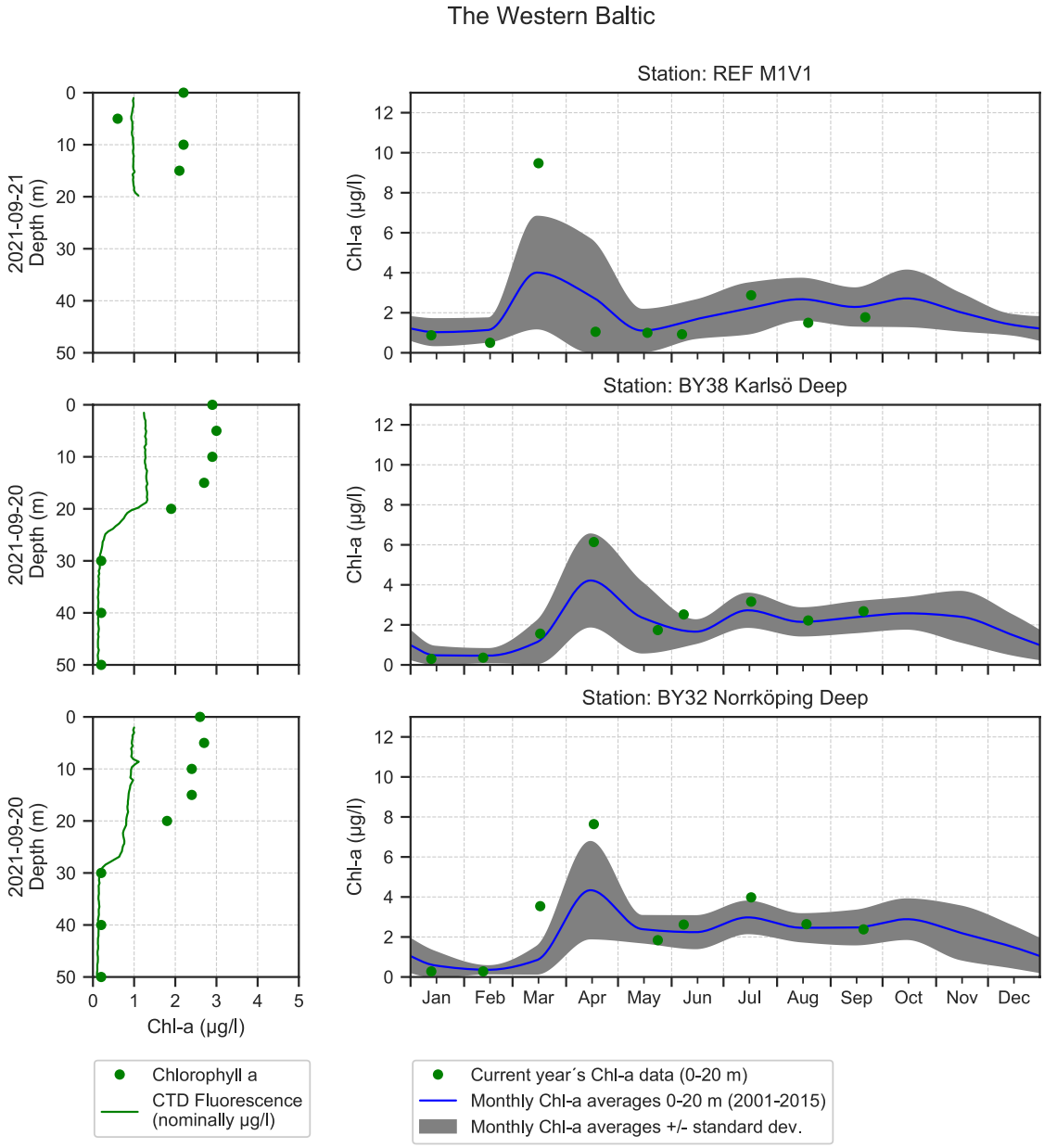
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38	REFM1V1
Red=potentially toxic species	19/9	18/9	18/9	19/8	20/9	21/9
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Actinocyclus	present			present		
Chaetoceros castracanei		present	present	present	common	present
Chaetoceros danicus						present
Coscinodiscus concinnus				common		
Coscinodiscus granii				common		
Cyclotella choctawhatcheeana					present	
Dinophysis acuminata		present				present
Dinophysis norvegica		present	present		present	present
Gymnodiniales	common	common	common	present	present	common
Heterocapsa rotundata			present	present	present	present
Peridiniales			present	present		present
Phalacroma rotundatum						present
Tripos muelleri		present				
Dinobryon faculiferum		present				
Prymnesiales	present				present	present
Monoraphidium				present	common	
Pyramimonas	common	present	present	present	common	present
Cryptomonadales	common	common	common	common	common	common
Eutreptiella	present				present	
Aphanizomenon flosaquae	present	common	common	common	common	common
Nodularia spumigena						present
Pseudanabaena	present		present		present	present
Snowella					present	
Ebria tripartita	present					present
Ciliophora	present	common	common	common	common	present
Mesodinium rubrum		present	present	common	common	present
Helicostomella subulata	present		present		present	
Strombidium	present			present	present	present


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2021-09-16
2021-09-17
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
2021-09-17
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 Southern Baltic
Station: BY1
Station: BY2 Arkona
Station: BY4 Christiansö
Station: BY5 Bornholm Deep
2021-09-18
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
2021-09-19
2021-09-20
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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