SMHI
Oceanographic Unit
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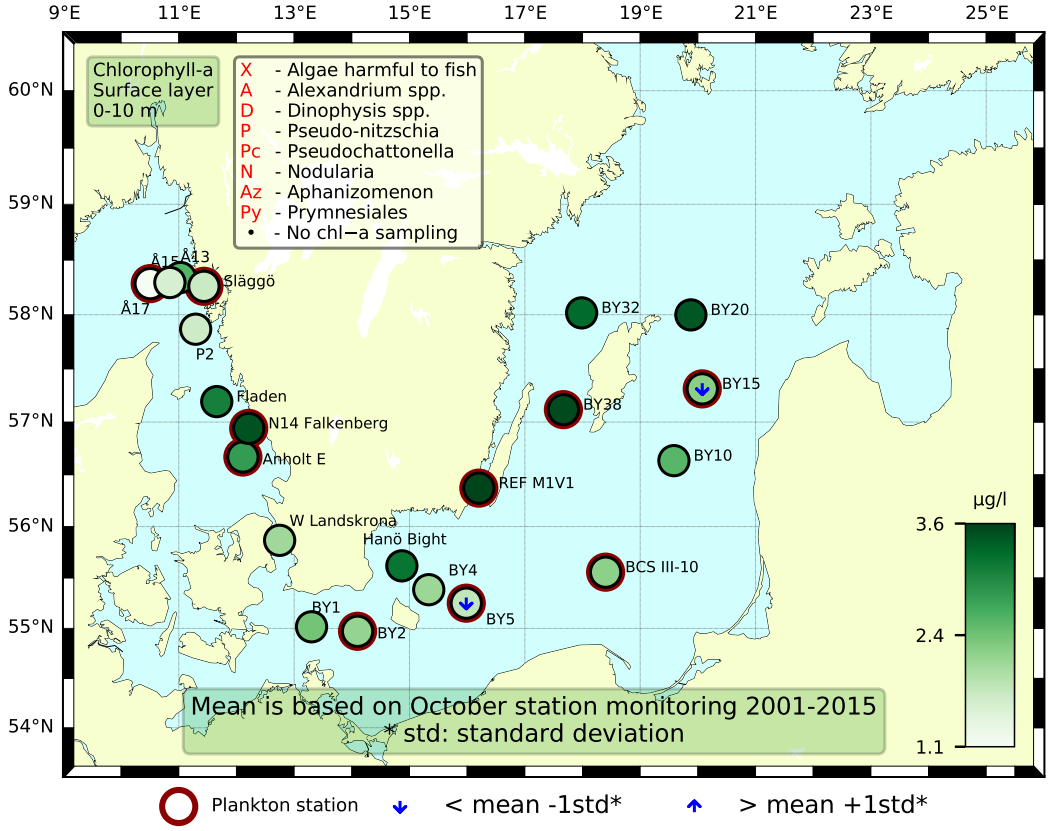
AlgAware
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Dnr: S/Gbg-2021-152

Sammanfattning

I Västerhavet var artdiversiteten hög vid tre av fyra stationer och högst vid Kattegattstationerna. Det var framför allt kiselalger som dominerade proverna men de individuella cellantalen var relativt låga eller moderata. De integrerade klorofyllkoncentrationerna var normala för månaden.

Artdiversiteten och totala cellantal var generellt normala i Egentliga Östersjön. De arterna med högst cellantal var de små *Cryptomonadales*, *Heterocapsa rotundata* och olika ciliater, men de stora kiselalgerna var på sina håll rätt många. *Aphanizomenon flosaquae* återfanns på alla stationer utom en, och ibland i rätt stora cellantal. Det toxinproducerande *Dinophysis*-släktet fanns på de södra och västra stationerna. Ferryboxen ombord R/V Svea uppmätte höga halter av cyanobakteriepigmentet fykoerytrin, framförallt vid BCSIII-10. De integrerade klorofyllkoncentrationerna var låga eller normala för månaden.



Abstract

The species diversity was high at three of four stations int the Kattegat and Skagerrak areas and the highest at the Kattegat stations. Diatoms dominated the samples, but the individual cell numbers were relatively low or moderate. The integrated chlorophyll concentrations were within normal for this month.

The total cell numbers and the species diversity were both moderate at the Baltic Proper phytoplankton stations. The most numerous species were the small *Cryptomonadales*, *Heterocapsa rotundata* and various ciliates, but large diatoms were at places quite numerous. *Aphanizomenon flosaquae* were found at all stations but one, and sometimes in quite high numbers. The toxin producing *Dinophysis*-genus was found at the southern and western stations. The ferrybox onboard R/V Svea recorded high amounts of the cyanobacterium pigment phycoerythrin, especially at BCSIII-10. The integrated chlorophyll concentrations were low or within normal for this month.

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

Å17 (open Skagerrak) 17th of October
The phytoplankton diversity and the total cell numbers were low which also reflected the large secchi depth of 13 meters. Mostly small species were found of which the coccolithophore *Emiliania huxleyi,* cryptomonadales species and ciliates were the most common. The integrated chlorophyll concentrations were within normal for this month.

Släggö (Skagerrak coast) 17th of October
The species diversity was higher than at Å17 with twice as many species, but the cell numbers were low. The potentially toxic diatom genus *Pseudo-nitzschia** was found in moderate cell numbers as were *E. huxleyi* and cryptomonadales species. The integrated chlorophyll concentrations were within normal for this month.

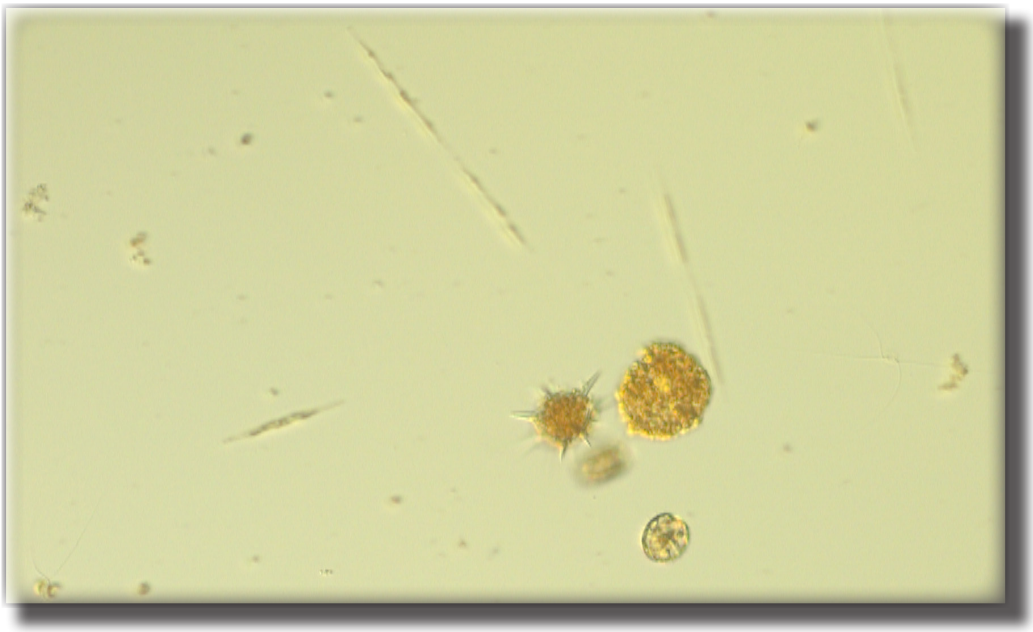


Figure 1. The round cell next to the spiny one (*Octactis speculum*) is a life stage of *Vicicitus globosus.* It was found at both of the Kattegat stations and at Släggö in the Skagerrak. Photo: Ann-Turi Skjevik.

The Kattegat

Anholt E 16th of October
The species diversity was high with approximately the same amount of diatoms as of dinoflagellates. The diatoms were the most numerous though, with elevated cell numbers of amongst others *Chaeotoceros* cf. *convolutus, Dactyliosolen fragilissimus,* and *Pseudo-nitzschia**. *E. huxleyi* and the flagellate *Octactis speculum* were found in moderate cell numbers. The integrated chlorophyll concentrations were within normal for this month.

N14 Falkenberg 16th of October
Diatoms dominated the sample with their species richness and total cell numbers. The individual species were however found in low or moderate cell numbers. More or less the same diatoms were common as at Anholt E, in addition the dinoflagellate *Tripos lineatus* was found in elevated numbers. *E. huxleyi* and the flagellate *Octactis speculum* were found in moderate numbers. The integrated chlorophyll concentrations were within normal for this month.

The Baltic

BY2 15th of October
The total cell numbers were high among the small cells but the species diversity was moderate. The sample was dominated by *Heterocapsa rotundata*, *Cryptomonadales* and various ciliates. There were several species of large diatoms present, such as *Chaetoceros castracanei*, as well as the toxin producing dinoflagellate *Dinophysis norvegica**. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were normal for this month.

BY5 15th of October
The total cell numbers were low while the species diversity was high. The sample was dominated by small cells, various ciliates and some cyanobacteria species. There were several species of large diatoms present, as well as the toxin producing *Dinophysis norvegica**. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were both below normal for this month.

BCSIII-10 14th of October
The total cell numbers and the species diversity were moderate. The sample was dominated by small cells, such as *Cryptomonadales*, *Ebria tripartita* and ciliates, as well as the two filamentous cyanobacteria *Aphanizomenon flosaquae* and *Pseudanabaena* sp. These two cyanobacteria quite possibly resulted in the high concentration of phycoerythrin recorded by the ferrybox onboard R/V Svea. One or two filaments of *Nodularia spumigena** were also present. There were also some diatoms and dinoflagellates, but not in any high numbers. The integrated chlorophyll concentration 0-10 m was normal, while 10-20 m was below normal for this month.

Figure 2. The large diatoms *Coscinodiscus centralis* (left) and *Chaetoceros castracanei* (right) were quite numerous in the Baltic Sea in October. Photo: Maria Karlberg.

BY15 13th of October
The total cell numbers and biodiversity were moderate. The sample was dominated by smaller cells, such as *Cryptomonadales* and various species of Choanoflagellates. There were several species of large diatoms present, such as *Chaetoceros castracanei*, *Coscinodiscus centralis* and *Actinocyclus* sp. *Gymnodiniales* were also quite numerous. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were both below normal for this month.

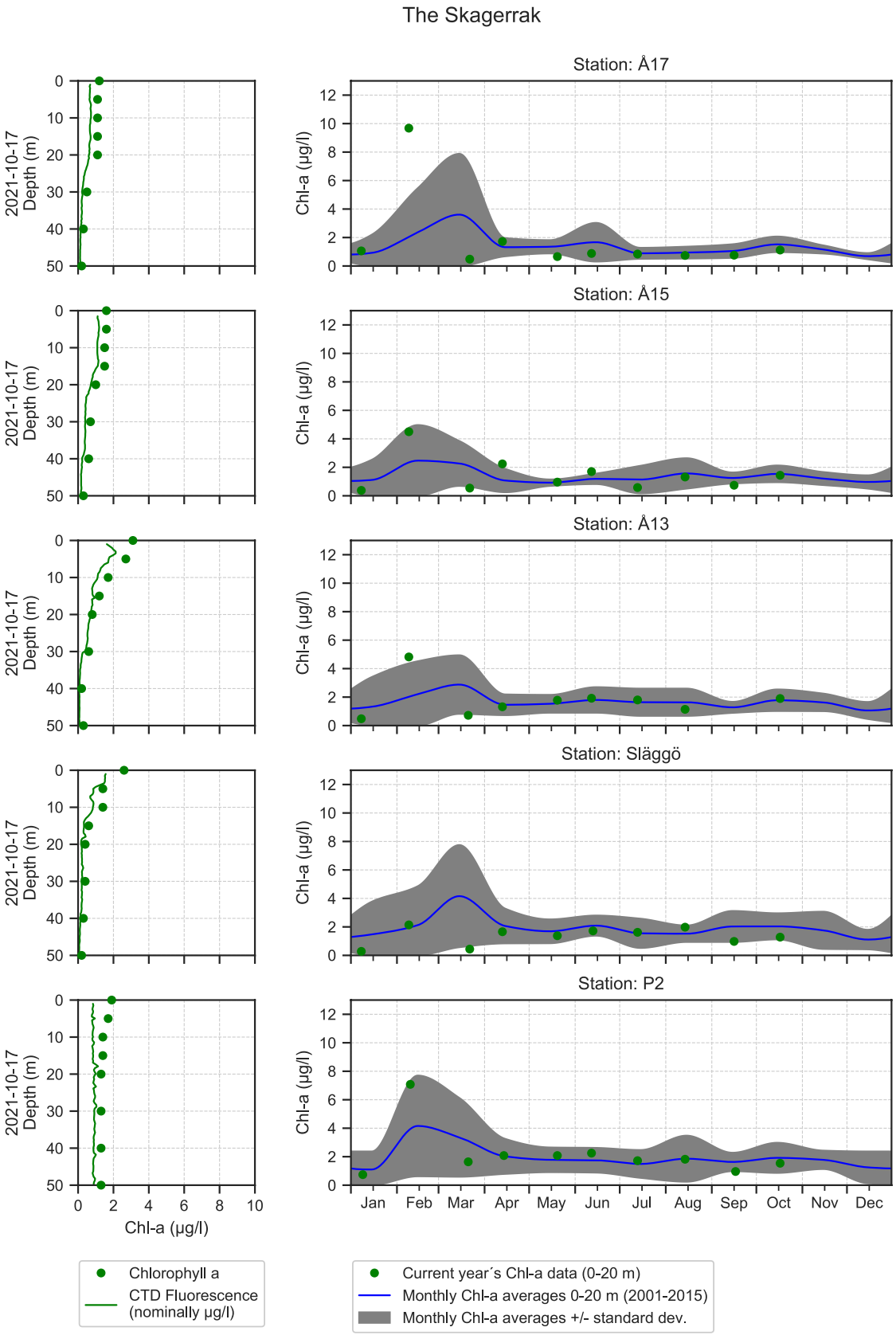
BY38 12th of October
The total cell numbers and the species diversity were both moderate. The sample was dominated by small cells such as *Heterocapsa rotundata*, *Cryptomonadales* and *Monoraphidium* sp. in combination with large cells of *Coscinodiscus centralis*, *A. flosaquae* and various ciliates. The toxin producing *Dinophysis acuminata** and *D. norvegica** were also present. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were within normal for this month.

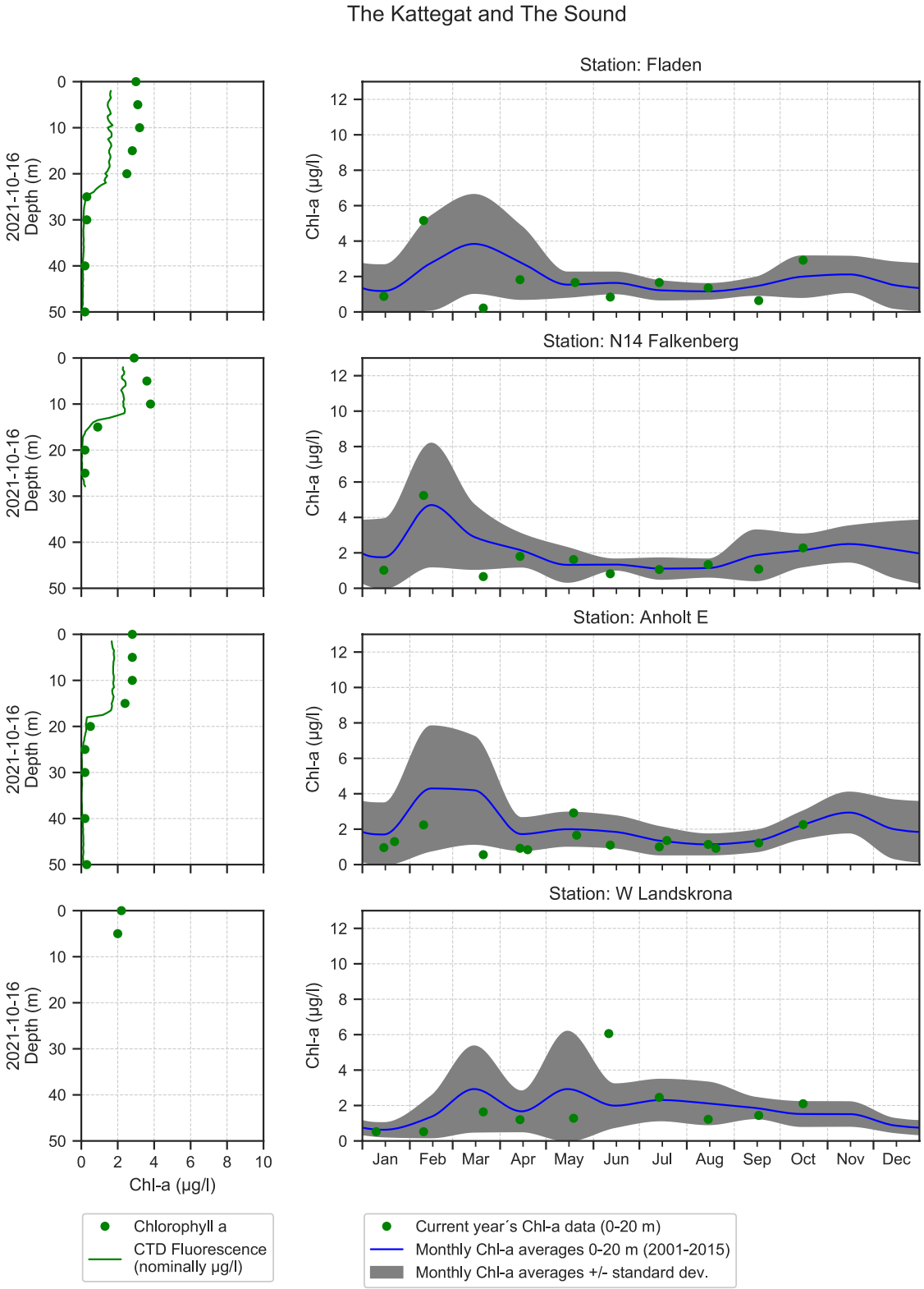
REFM1V1 12th of October
The total cell numbers and the species diversity were quite high. The sample was dominated by *Skeletonema marinoi* and various ciliates. Large diatoms were quite numerous and the toxin producing *Dinophysis acuminata** and *D. norvegica** were present. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were within normal for this month.

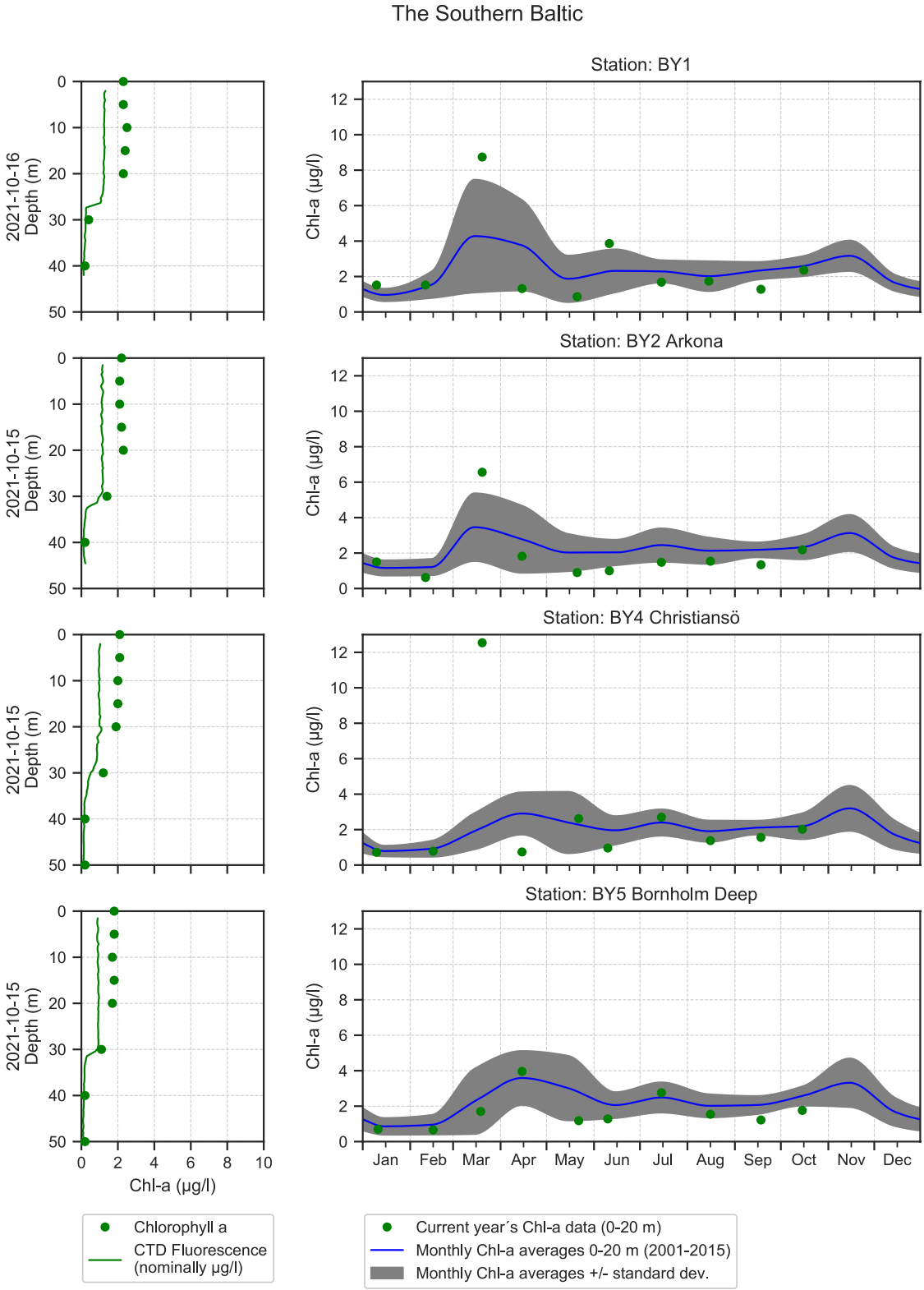
Phytoplankton analysis and text:
Ann-Turi Skjevik and Maria Karlberg

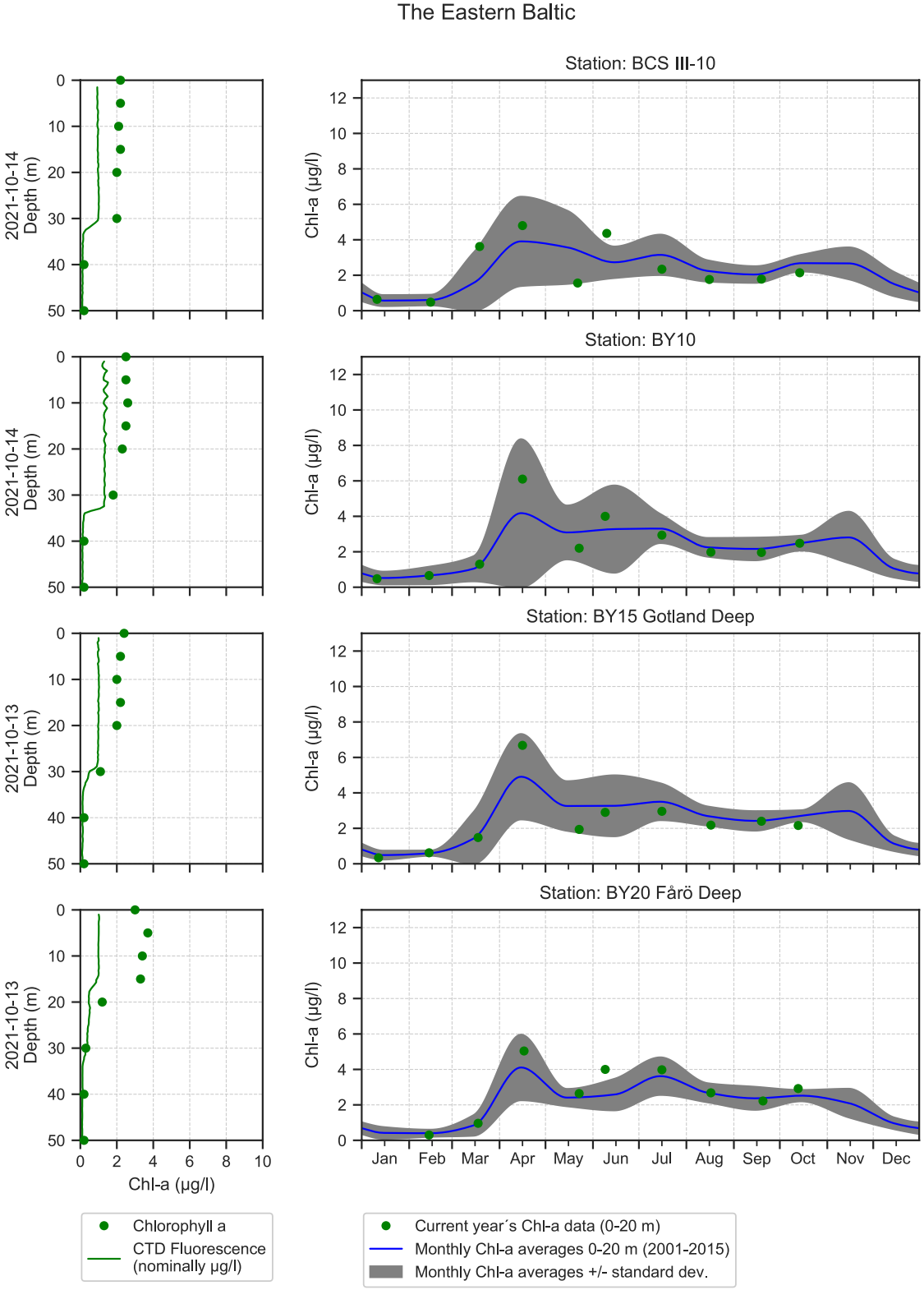
Selection of observed species	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	16/10	16/10	17/10	17/10
Hose 0-10 m	presence	presence	presence	presence
Attheya septentrionalis	present	present		
Cerataulina pelagica	present	present		
Chaetoceros affinis	present	present		
Chaetoceros brevis	present			
Chaetoceros cf. convolutus	common	present		
Chaetoceros convolutus				
Chaetoceros curvisetus	present	present	present	
Chaetoceros danicus	present	present		present
Chaetoceros didymus	present			
Chaetoceros socialis	present	present	present	
Chaetoceros subtilis		present		
Chaetoceros throndsenii	present			
Coscinodiscus			present	
Dactyliosolen fragilissimus	common	common	present	
Ditylum brightwellii	present	present	present	
Guinardia delicatula	present	present	present	
Guinardia flaccida	present	present		
Leptocylindrus danicus	present	present	present	
Leptocylindrus minimus	present	present	present	
Nitzschia longissima	present	present	present	present
Pseudo-nitzschia	common	common	common	present
Pseudo-nitzschia seriata		present		
Pseudosolenia calcar-avis	common	common	present	
Rhizosolenia imbricata				present
Rhizosolenia setigera	present	present	present	
Rhizosolenia setigera f. pungens	present	present	present	
Skeletonema marinoi	common	common	present	present
Thalassionema nitzschioides	present	present	present	
Thalassiosira angulata	present		present	
Thalassiosira gravida	present	present	present	
Thalassiosira punctigera	present			
Amphidinium crassum		present		
Amphidinium sphenoides	present			
Dinophysis acuminata	present	present	present	
Dinophysis norvegica	present	present		
Gymnodinium litoralis	present	common	present	present
Gymnodinium verruculosum	present	present		present
Gyrodinium flagellare		present	present	present
Gyrodinium spirale		present		
Heterocapsa triquetra	present			
Karenia mikimotoi	present	present	present	
Katodinium glaucum	present	present		
Lessardia elongata		present		
Oxytoxum gracile	present		present	present
Phalacroma rotundatum	present			
Polykrikos schwartzii	present	present		
Prorocentrum cordatum	present		present	
Prorocentrum micans	present	present		
Prorocentrum triestinum	present			
Protoperidinium	present			
Protoperidinium bipes	present			
Protoperidinium oblongum		present		
Protoperidinium steinii	present			
Sclerodinium calyptroglyphe				present
Scrippsiella			present	
Torodinium robustum	present			
Tripos fusus	present			
Tripos lineatus	present	common		
Tripos longipes		present		
Tripos macroceros	present			
Tripos muelleri	present	present	present	
Emiliania huxleyi	common	common	common	common
Pleurochrysis				present
Prymnesiales	present		present	
Heterosigma akashiwo	present	present		present
Dictyocha fibula		present	present	
Vicicitus globosus	present	common	present	
Octactis speculum	common	common	present	
Pseudopedinella		present	present	present
Pseudanabaena	present	present	present	
Pyramimonas longicauda			present	
Cryptomonadales	common	common	common	common
Eutreptiella				present
Monoraphidium			present	
Ebria tripartita		present		
Leucocryptos marina	present		present	present
Ciliophora	present	present	present	common
Laboea strobila	present	present		present
Strombidium		present		present

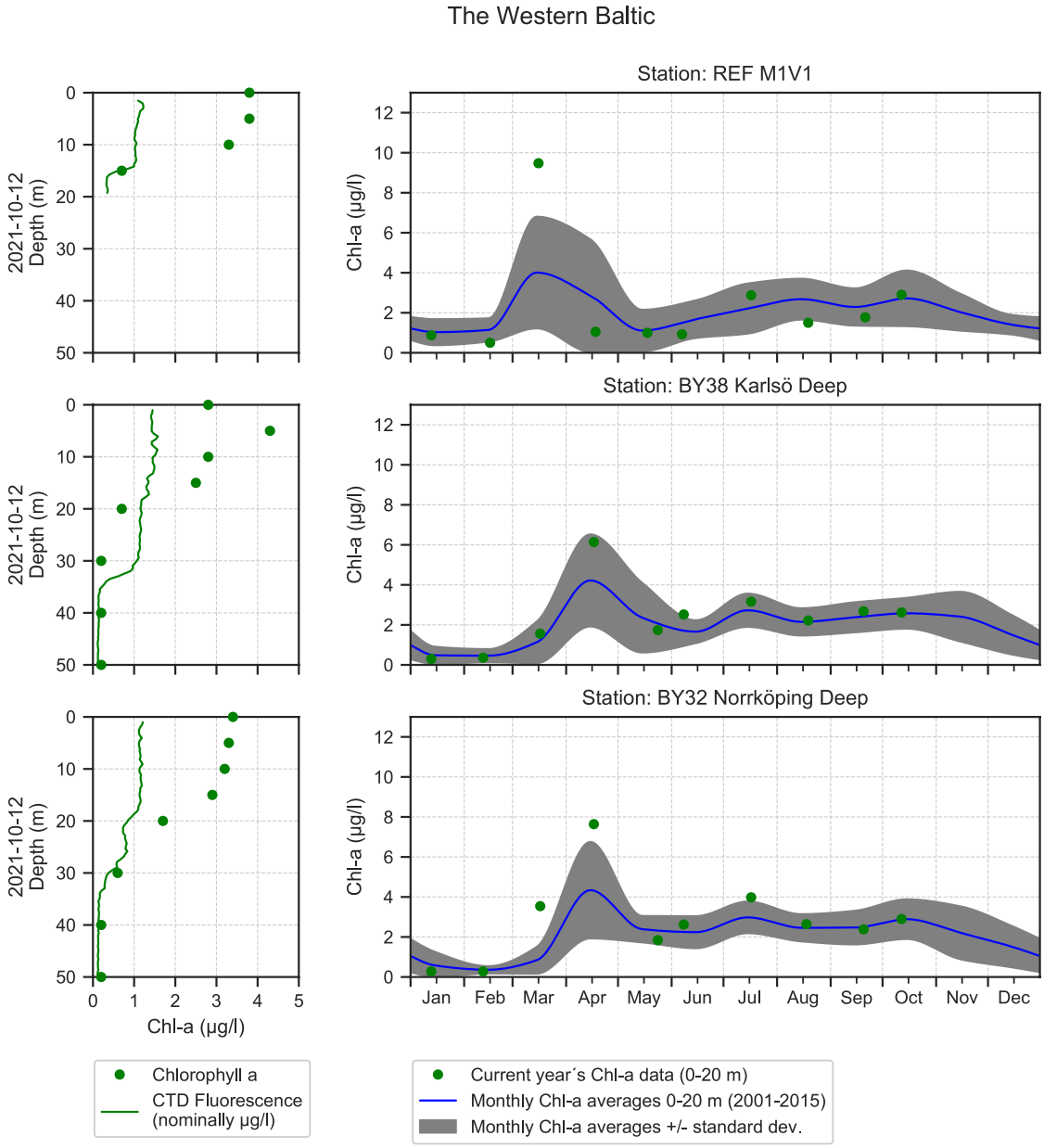
Selection of observed species	BCSIII-10	BY15	BY2	BY38	BY5	REFM1V1
Red=potentially toxic species	14/10	13/10	15/10	12/10	15/10	12/10
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Actinocyclus	present	common		present	present	
Centrales	present	common	present	present	present	present
Cerataulina pelagica	common					
Chaetoceros						present
Chaetoceros castracanei	present	common	common	common	common	common
Chaetoceros danicus	present	present	present	present	present	present
Coscinodiscus centralis		common	present	very common	present	common
Coscinodiscus radiatus					present	
Dactyliosolen fragilissimus	present		present			
Nitzschia longissima				present		present
Skeletonema marinoi						very common
Thalassiosira nordenskioeldii			present			present
Dinophysis acuminata				present		present
Dinophysis norvegica			present	present	present	present
Dissodinium pseudolunula			present			
Gymnodiniales	common	common	common	common	common	common
Gymnodinium verruculosum	present	present	present		present	
Gyrodinium flagellare				present		
Gyrodinium spirale		present				present
Heterocapsa rotundata	common		very common	very common	common	present
Heterocapsa triquetra			present			present
Katodinium glaucum		common	present		present	
Peridiniales						present
Tripos muelleri			present			
Monoraphidium				very common	present	present
Halosphaera						present
Pyramimonas	common	present	common	common	common	
Cryptomonadales	very common	very common	very common	very common	common	common
Telonema		present				
Pseudopedinella			common	present	present	
Eutreptiella	present		common	common	common	common
Aphanizomenon flosaquae	very common		common	very common	common	present
Aphanothece		present				
Chroococcus	present					
Nodularia spumigena	present				present	
Pseudanabaena	very common	present	present	common	common	common
Snowella				present	present	
Choanoflagellatea		very common	present		present	common
Ebria tripartita	very common		common		common	
Ciliophora	very common	common	very common	very common	common	very common
Mesodinium rubrum	common	common	present	common	common	common
Strombidium	present	present	common	present	present	present
Tintinnopsis						common
Flagellates	present	present	common	common	present	present


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2021-10-17
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
2021-10-16
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
2021-10-16
2021-10-15
2021-10-15
2021-10-15
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
2021-10-14
2021-10-13
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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