SMHI
Oceanographic Unit
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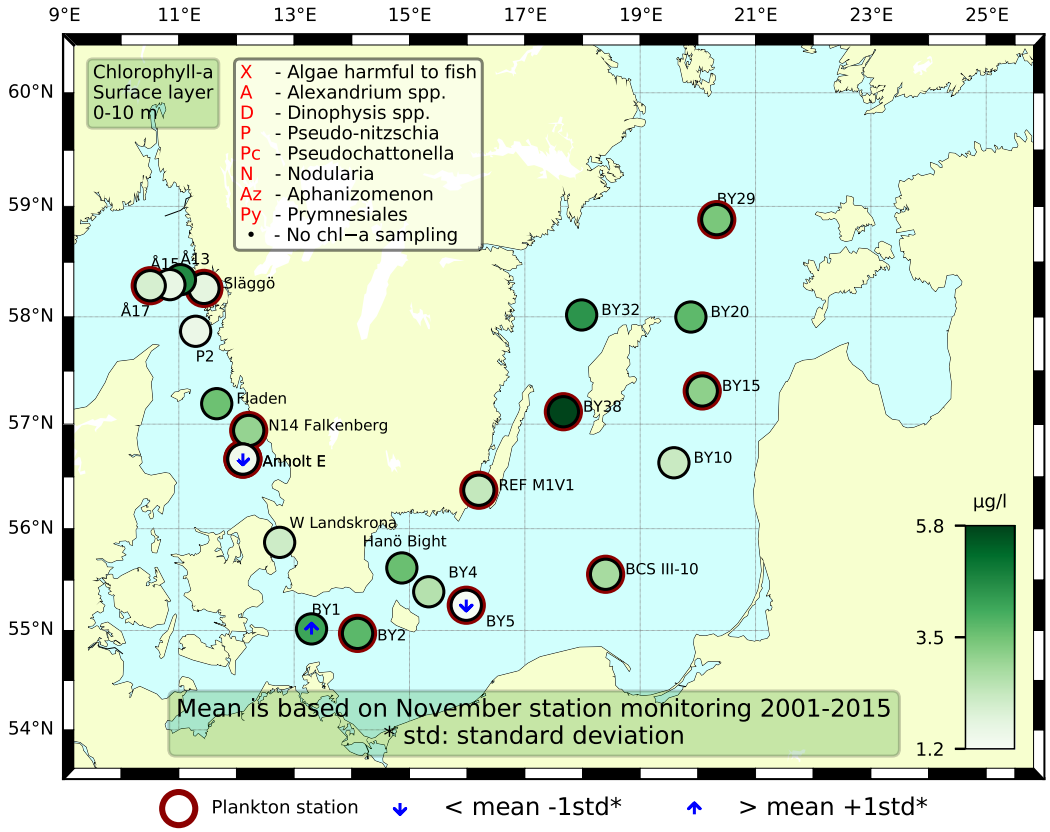
AlgAware
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Dnr: S/Gbg-2021-168

Sammanfattning

I Västerhavet var artdiversiteten relativt hög vid flertalet stationer. Totala cellantalen varierade men var låga vid några stationer. Det var framför allt kiselalger som dominerade proverna men även ordningen Dictyocales med till exempel arten *Octactis speculum,* var talrik. Kalkalgen *Emiliania huxleyi* återfanns i moderate cellantal vid alla stationer. De integrerade klorofyllkoncentrationerna var generellt sätt normala i Skagerrak. I Kattegatt var de normala utom vid Anholt E där de var lita lägre än normalt för månaden.

Artdiversiteten och totala cellantal var låga i egentliga Östersjön vilket inte är ovanligt för månaden. I norra delen av Östersjön dominerade stora centriska kiselalger i proverna. Vid BY2, den planktonstation som ligger närmast västerhavet, återfanns flertalet arter som normalt förekommer i västerhavet, exempelvis var kiselalgen *Pseudosolenia calcar-avis* ganska talrik. De integrerade klorofyllkoncentrationerna varierade. I den norra delen av Östersjön var det vid flera stationer högre än normalt. Vid de sydliga stationerna var de generellt sätt inom det normala för månaden.



Abstract

The species diversity was high at most stations along the west coast. The total cell numbers varied but quite many stations had low numbers. Diatoms dominated in the samples but the order Dictyocales including the species *Octactis speculum* was common. The coccolithophore *Emiliania huxleyi* was found in moderate cell numbers at all stations. The integrated chlorophyll concentrations were generally within normal for this month in the Skagerrak. In the Kattegat they were also within normal for the month except at Anholt E where they were a bit lower than normal.

The total cell numbers and biodiversity were low at all the Baltic Proper phytoplankton stations which is not unusual for this month. At the northern stations large centric diatoms dominated. At the south eastern station BY2, closest to the west coast, several species normally found along the west coast were recorded. For example the diatom *Pseudosolenia calcar-avis* was found in relatively high cell numbers. The integrated chlorophyll concentrations were higher than normal at the northern stations. The southern stations generally had concentrations within normal for this 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) 8th of November
The phytoplankton diversity was high whereas the total cell numbers were low. Several species more associated with the North Sea was found such as *Proboscia indica* and *Lauderia annulata*. Most commonly found was however small cells where *Emiliania huxleyi* was the most common. The integrated chlorophyll concentrations were slightly above normal for this month.

Släggö (Skagerrak coast) 8th of November
The species diversity and the cell numbers were both moderate. The order Dictyocales was most common and within that order *Octactis speculum* was common. The diatom *Lauderia anulata* was found which is a species normally found in the North Sea but occasionally also recorded along the Swedish west coast. Some cells of *Emiliania huxleyi* were noted. The integrated chlorophyll concentrations were within normal for this month.

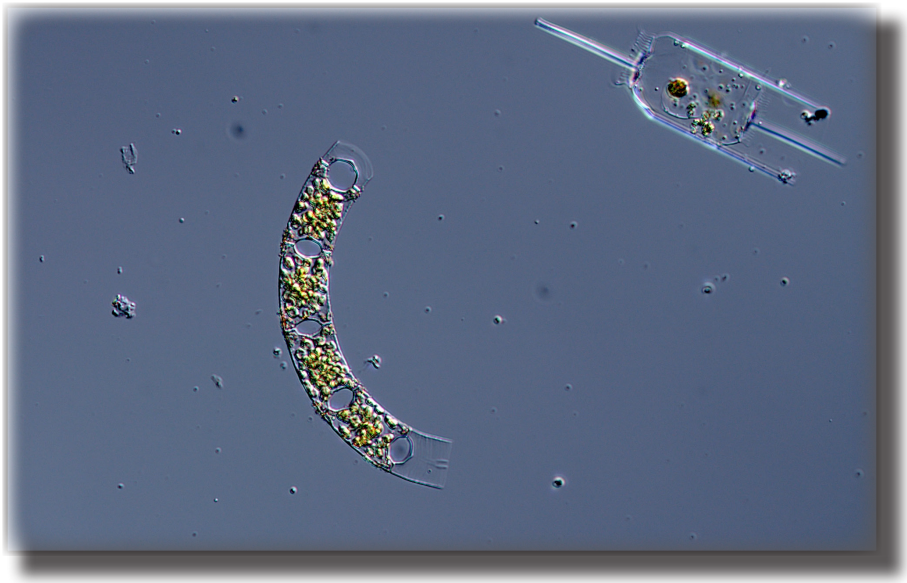


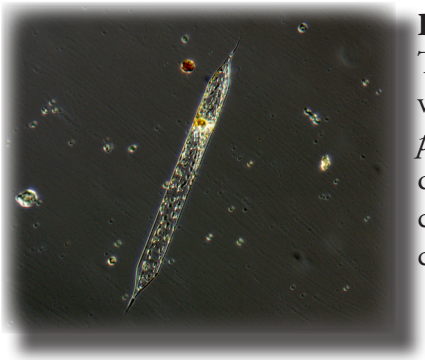
Figure 1. The beautiful diatom *Eucampia zodiacus* and other more exotic species was present at Å17. Photo: Marie Johansen.

The Kattegat

Anholt E 9th and 14th of November
The species diversity was relatively high but total cell numbers moderate on both occasions. Both sampling occasions were quite similar in species composition. A mixture of different groups existed and the diatom *Pseudosolenia calcar-avis* was common together with *Octactis speculum*. The coccolithophore *Emiliania huxleyi* was found in moderate amounts. The integrated chlorophyll concentrations were below normal for this month.

N14 Falkenberg 9th of November
Species diversity and total cell numbers were relatively high. Among the larger cells diatoms dominated and for example *Pseudosolenia calcar-avis* and *Rhizosolenia setigera* were common. The order Dictyochales including *Octactis speculum* among others was found in high cell numbers. Among the smaller cells the coccolithophore *Emiliania huxleyi* was found in relatively high numbers of cells. The integrated chlorophyll concentrations were within normal for this month.

The Baltic



BY2 10th of November
The total cell numbers and species diversity were both moderate. The sample was dominated by diatoms and the species *Pseudosolenia calcar-avis*, *Cerataulina pelagica* and *Chaetoceros castracanei* were the most common. Among the dinoflagellates, *Tripos muelleri* was found in moderate amounts. The smaller cells were dominated by different cryptomonads. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were normal for this month.

Figure 2. At BY2 in the southwestern part of the Baltic, several species more regularly found along the Swedish west coast was recorded. One example was the diatom *Pseudosolenia calcar-avis* that was found in relatively high cell numbers.

BY5 10th of November
The total cell numbers and species diversity were both low. The sample was dominated by the diatom genus *Actinocyclus*. Some chains of the diatom genus *Chaetoceros* were present. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were both below normal for this month.

BCSIII-10 10th of November
The total cell numbers and the species diversity were low. The sample was dominated by the diatom genus *Actinocyclus.* The smaller cells were dominated by different cryptomonadales. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were within normal for this month

BY15 11th of November
The total cell numbers and biodiversity were low. The sample was dominated by large centric diatom cells such as the genus *Coscinodsicus* and the genus *Actinocyclus*. Quite a lot of ciliates where also present, for example *Mesodinium rubrum*. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were within normal for this month

BY38 13th of November
The total cell numbers and the species diversity were both low. The sample was dominated by large centric diatoms of the genus *Coscinodiscus* together with some cells of the genus *Actinocyclus.* The integrated chlorophyll concentration from 0-10 meters was above normal for this month.

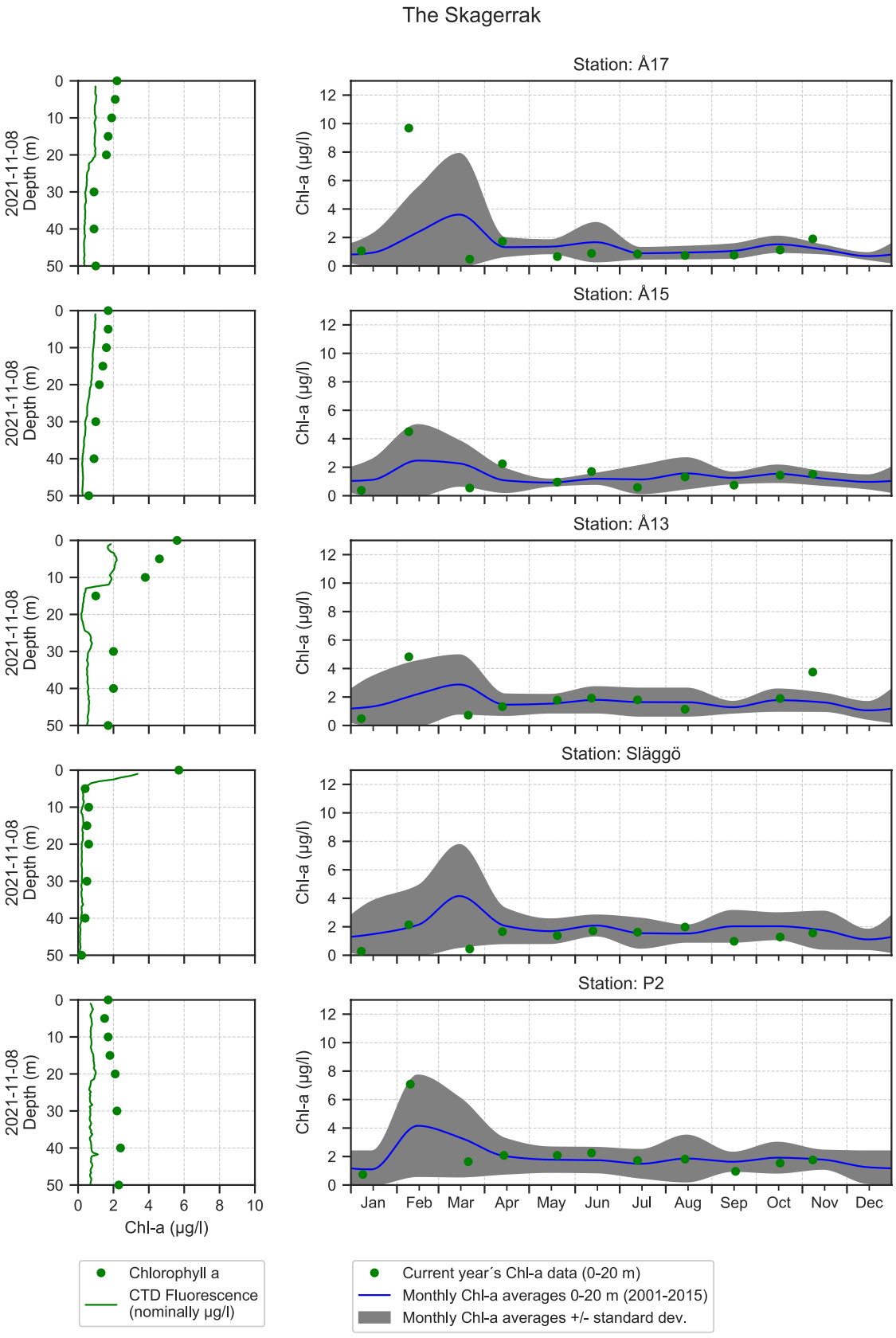
REFM1V1 13th of November
The total cell numbers and the species diversity were both low. The sample was dominated by the diatom genus *Actinoclus* and the dinoflagellate order Gymnodoniales. The smaller cells were dominated by different cryptomonadales. The integrated chlorophyll concentrations, 0-10 and 10-20 m, were within normal for this month.

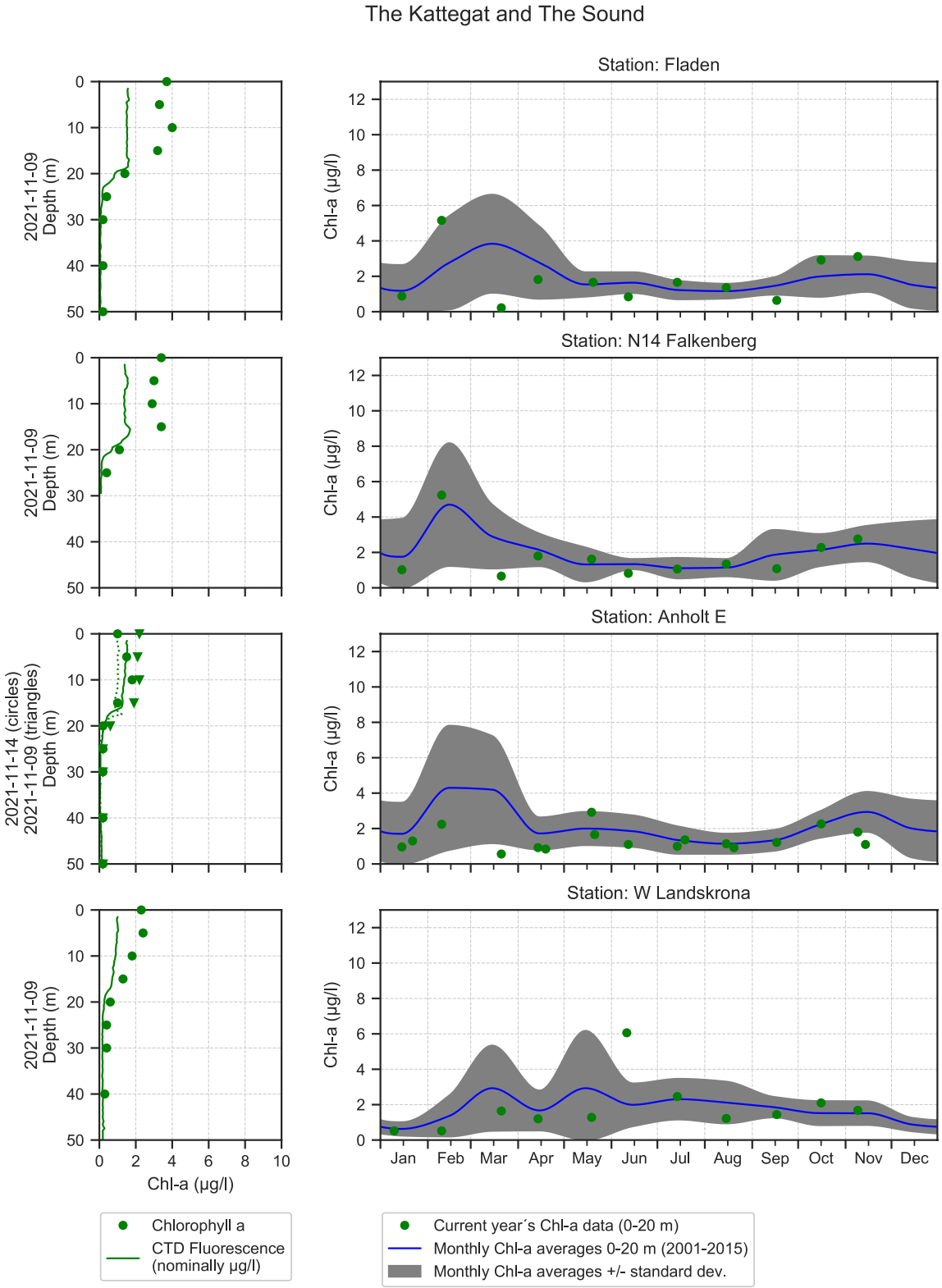
BY29 and BY31 12th of November
The total cell numbers and the species diversity were both low. The sample was dominated by the large centric diatoms genus *Coscinodiscus*. Some chains of the genus *Chaetoceros* were also recorded. A few colonies of cyanobacteria were noted such as the genus *Snowella.* No data on chlorophyll was available for these stations.

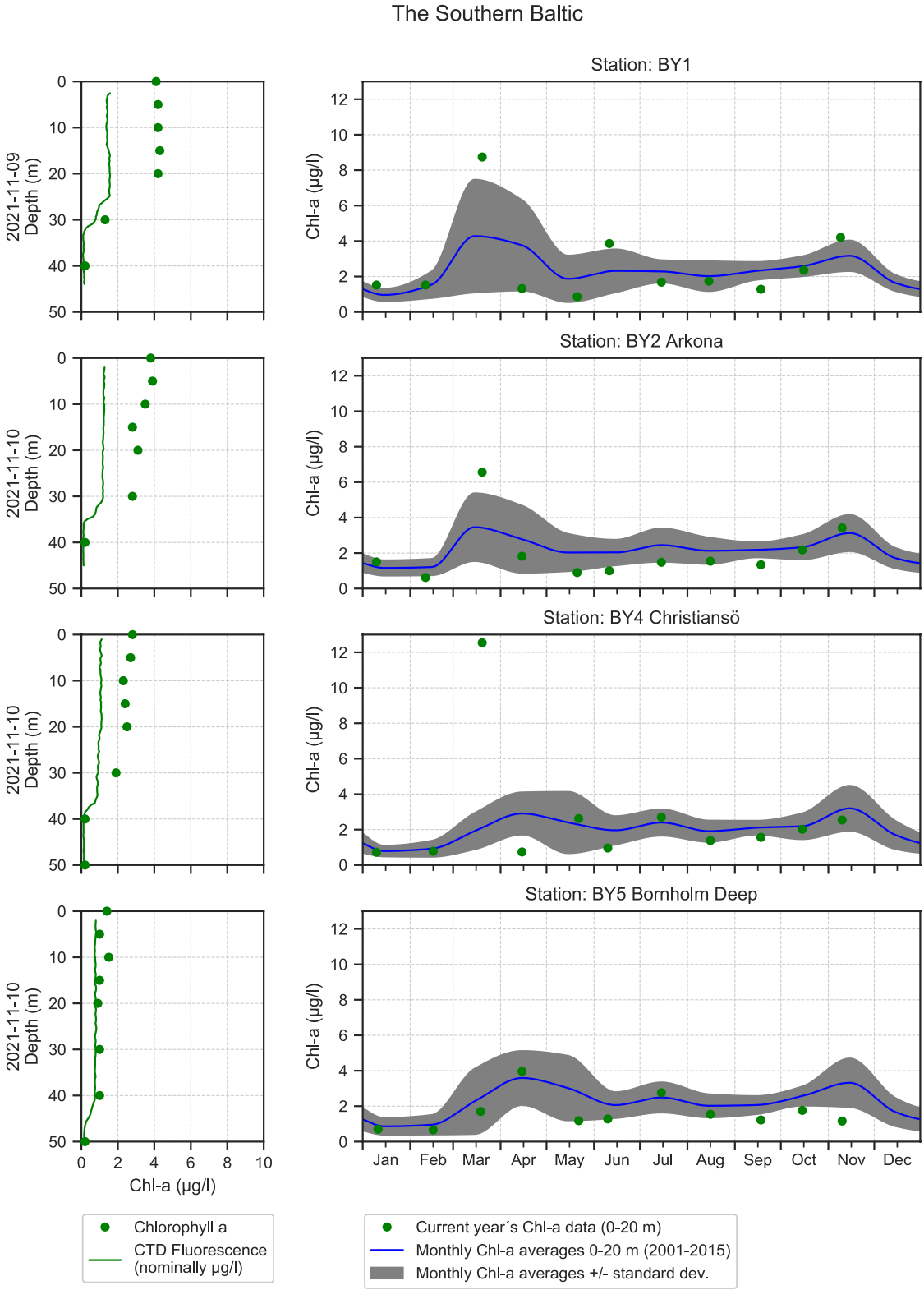
Phytoplankton analysis and text:
Marie Johansen

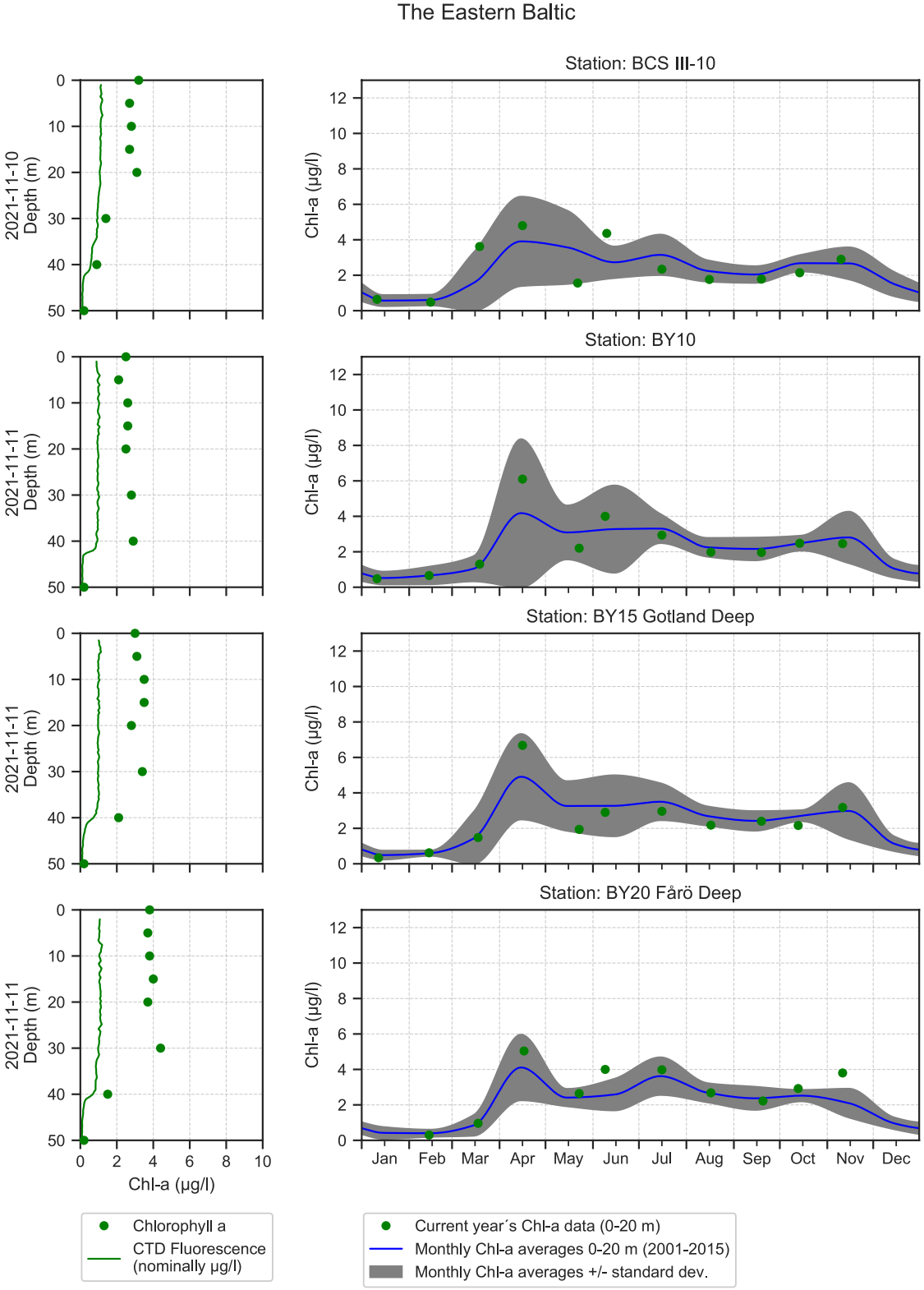
Selection of observed species	Anholt E	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	9/11	14/11	9/11	8/11	8/11
Hose 0-10 m	presence		presence	presence	presence
Bacillaria paxillifera					common
Cerataulina pelagica	present	present	present		
Chaetoceros			present		present
Chaetoceros affinis					present
Chaetoceros cf. convolutus	present				
Chaetoceros curvisetus					present
Chaetoceros similis	present				
Coscinodiscus					present
Coscinodiscus radiatus	present				
Dactyliosolen fragilissimus	present	present		present	
Ditylum brightwellii			present		
Eucampia zodiacus					present
Guinardia delicatula	present	present	present		present
Guinardia flaccida	common	present	common		
Lauderia annulata				present	present
Leptocylindrus danicus	present	present	common		present
Leptocylindrus minimus		present			
Meuniera membranacea					present
cf. Meuniera membranacea					present
Proboscia alata	present	present		present	
Proboscia indica					present
Pseudo-nitzschia	common	common	common	present	present
Pseudosolenia calcar-avis	very common	very common	very common	common	
Rhizosolenia imbricata					present
Rhizosolenia setigera	present	common	very common	present	
Rhizosolenia setigera f. pungens	present		present	present	
Skeletonema marinoi			common		present
Thalassionema nitzschioides					present
Thalassiosira					present
Thalassiosira gravida			present		
Amphidinium sphenoides					present
cf. Azadinium					present
Dinophysis acuminata	present				
Dinophysis norvegica	present	present	present	present	
Diplopsalis CPX	present				
Gymnodiniales	present	present	common	common	common
Gyrodinium flagellare					present
Gyrodinium spirale					present
Peridiniales				present	
Phalacroma rotundatum	present				
Prorocentrum balticum			present		
Prorocentrum compressum	present				
Prorocentrum micans	present	present	present	present	
Protoperidinium depressum		present			
Tripos furca					common
Tripos fusus			present		
Tripos lineatus		present		present	
Tripos longipes	present				present
Tripos macroceros	present	present		present	present
Tripos muelleri	present			present	
Emiliania huxleyi	common	common	common	present	common
Pleurochrysis				present	present
Chlorodendrales		present			present
Cryptomonadales	present	common	common	common	common
Apedinella radians			present		
Dictyocha fibula	common	present	present		
Dictyochales	common	very common	common	common	
Octactis speculum	very common	very common	common	common	
Pseudochattonella		present			
Pseudopedinella pyriformis		present			
Ciliophora	present	present		present	present
Laboea strobila		common			

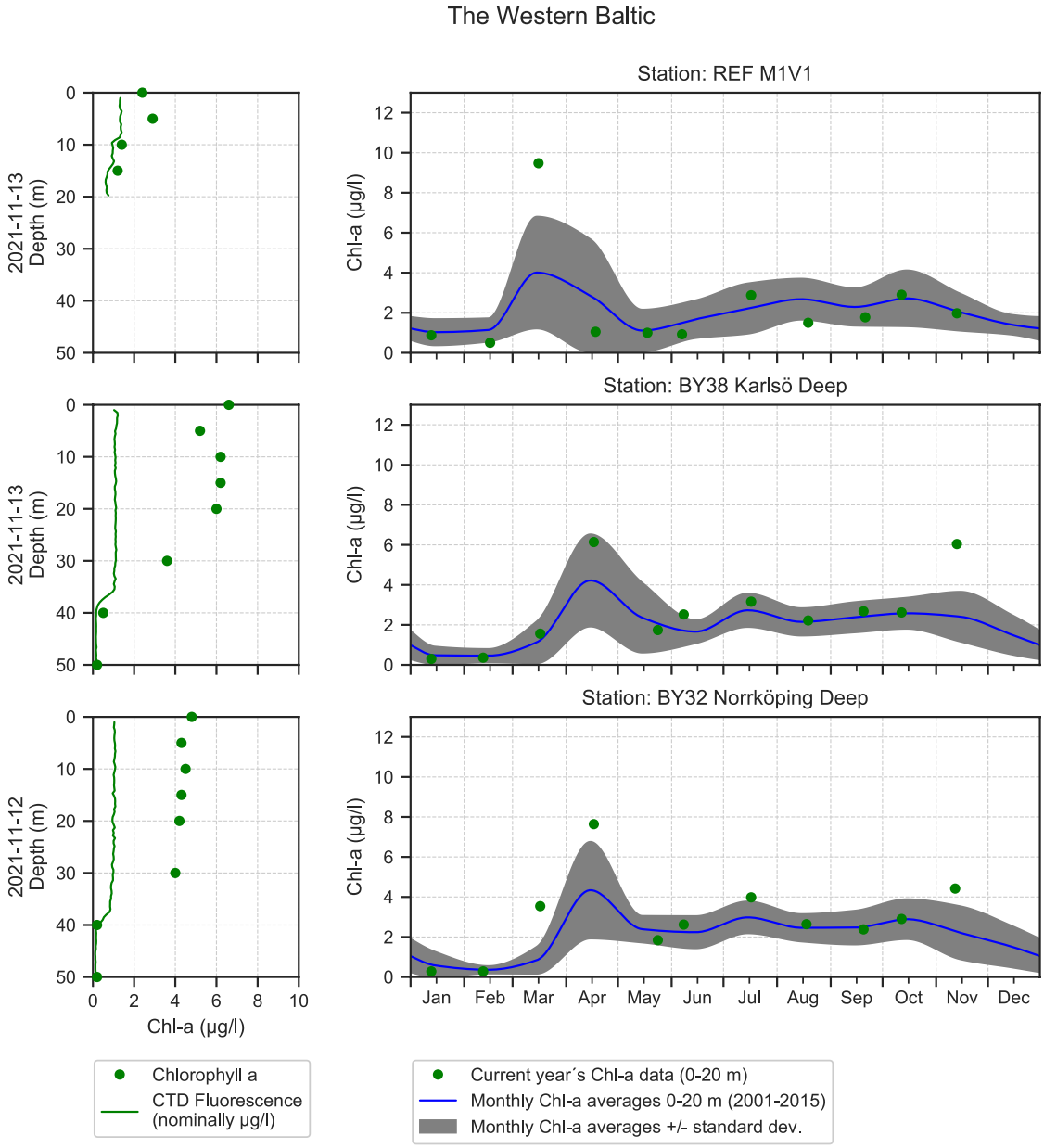
Selection of observed species	BCSIII-10	BY2 ARKONA	BY5	BY15	BY29	BY31	BY38	REFM1V1
Red=potentially toxic species	10/11	10/11	10/11	11/11	12/11	12/11	13/11	13/11
Hose 0-10 m	presence	presence	presence	presence			presence	presence
Actinocyclus	common	common	common	common	present	present	common	common
Cerataulina pelagica	present	common						
Chaetoceros castracanei	present	common	present	present	present	present		present
Chaetoceros cf. convolutus		present						
Chaetoceros danicus		present	present		present			present
Chaetoceros muelleri		present						
Coscinodiscus		present	present	common	common	common	common	
Coscinodiscus centralis	present	present	present	present	present	present	present	
Coscinodiscus granii				present	present			
Dactyliosolen fragilissimus		present						
Pseudosolenia calcar-avis		common						
Skeletonema marinoi		present						present
Dinophysis acuminata								present
Dinophysis norvegica								present
Gymnodiniales	present	common	common	present	present		present	common
Gyrodinium spirale								present
Heterocapsa rotundata	present			present				present
Katodinium glaucum	present							
Peridiniales				present				
Prorocentrum micans		common						
Oocystis					present		present	
Binuclearia lauterbornii				present				
Pyramimonas	present							
Cryptomonadales	common	common	present	present	present	present	common	common
Leucocryptos marina		present						
Pseudopedinella pyriformis								present
Eutreptiella gymnastica				present				
Aphanocapsa						present		
Lemmermanniella				present	present	present		
Pseudanabaena		present						present
Snowella				present	common	present	present	
Choanoflagellatea	common	present	present					
Ebria tripartita		present	present					
Ciliophora	present	present	present	common	present		present	common
Mesodinium rubrum	present		present	present			present	present


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2021-11-08
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
2021-11-09
Depth (m)
2021-11-14 (circles)
2021-11-09 (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
2021-11-09
2021-11-10
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
2021-11-10
2021-11-11
2021-11-11
2021-11-11
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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Havs
och Vatten
myndigheten